

# Balancing Migration: Overcoming the challenge to SaaS provisioning for core business activities: A South African case study



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## Dedication

To my wife and my daughter, this paper is dedicated to you. **“You are my inspiration for everything. Thank you for your belief in me, your support and your love. I love you”**

## Acknowledgement

*I will praise thee, O LORD, with my whole heart; I will shew forth all thy marvellous works. I will be glad and rejoice in thee: I will sing praise to thy name, O thou most High*

Psalm 9:1-2

Firstly, my thanks to God for everything. “All things were made by him; and without him was not any thing made that was made” John 1:3

To my parents and family (through consanguinity and through affinity) I thank you always for all that you have done and continue to do for me. My gratitude knows no bounds

To Professor Irwin Brown for your patience and guidance I thank you. The journey has been a long one and without your guidance and advice this paper would not be

Lastly, to my employers who have supported me over the last five years and to the individuals and organisations that have assisted with my research. Your contribution and trust is valued

## Abstract

Cloud computing provides shared information and communication technology (ICT) resources to individuals and organisations, including hardware and software resources that were previously too costly for an individual organisation to manage and own. Cloud computing makes vast amounts of ICT resources available to business organisations, resources that can improve business processes and allow business organisations to leverage ICT in ways that were previously impossible. The correct implementation, adoption and usage of ICT within a business organisation can lead to enhancements in productivity, innovation, and new products and services, as well as the reduction of production costs. Recent literature has attested to the fact that the adoption of cloud computing has been much lower than expected. Business organisations that have adopted cloud computing have done so mainly in products and services that can be categorised as support or non-core activities, such as HR, accounting, and marketing.

In order to understand why the adoption pattern of cloud computing in business organisations has focused mainly on non-core activities, this study aims to identify the core challenge facing cloud service providers (CSPs) that provision cloud solutions to business organisations in the investment management industry. These would include cloud solutions that investment managers can use in their core business activities. Furthermore, the aim of this dissertation is to identify how CSPs overcome the core challenge faced. A case study was performed on a single CSP that provisions a SaaS solution to the investment management sector in South Africa. The case study identified migration as the core challenge experienced by CSPs. Classical grounded theory was used to generate the theory of “Balancing Migration” being the resolution to the core challenge identified.

The results of the study point to the fact that investment management organisations have processes and systems that have become entrenched in their business over many years. Migrating an established system to the cloud is more than just substituting software. Migration to the cloud requires investment managers to migrate both business processes and operating strategy, and to migrate the actual software products and infrastructure. A CSP provisioning a SaaS solution for a core business activity needs to migrate the products that they offer as well as their business strategy.

The theory of “Balancing Migration” proposes that these four categories of migration challenges need to be addressed simultaneously and holistically. In summary, “Migration” is the core concern to a CSP provisioning a SaaS solution for a core business activity, and “balancing migration” is how this core concern is resolved.

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## Acronyms

The following acronyms are used throughout this research paper;

BPO – Business process outsourcing

CGT - Classic grounded theory

CSP - Cloud service provider

GTM - Grounded theory method

IaaS - Infrastructure as service

ICT – Information and communication technology

IP - Intellectual property

IT - Information technology

ITO - IT outsourcing

PaaS - Platform as a service

SaaS - Software as a service

SGT – Straussian grounded theory

SLA – Service level agreement

SOA – Service Orientated Architecture

# Chapter 1: Introduction

## 1.1. Background

Cloud computing is a major technological change that offers business organisations the opportunity to shift information technology (IT) to a service that business organisations purchase (Khajeh-Hosseini, Greenwood, Smith, & Sommerville, 2012). Cloud computing offers a range of advantages to business organisations. It makes IT resources available to these organisations at much lower costs than previously. Effective utilisation of IT resources allows business organisations to innovate and to offer new products and services as well as to improve on existing offerings (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011; Gupta & Varshapriya, 2014; Venters & Whitley, 2012).

The literature shows that, in spite of its obvious advantages to business organisations, the actual rate of adoption of cloud computing is much lower than one would expect, and that the adoption of cloud computing for core business activities specifically is almost non-existent (Akande & Van Belle, 2014; Cohen, Mou, & Trope, 2014; Howell-Barber, Lawler, Desai, & Joseph, 2013). While the majority of sources from the reviewed literature show that cloud adoption tends to focus on the business organisation making the adoption decision, and the factors influencing this decision, this study examines the cloud adoption question from the opposite side of the spectrum: from that of the cloud service provider.

### 1.1.1. Cloud computing

Cloud computing offers business organisations numerous benefits, such as lower cost of entry, immediate access to IT hardware resources, a reduction of IT barriers to innovation, improved scalability for businesses organisations, and the opportunity for business organisations to potentially offer new products and services to their customers (Marston et al., 2011). Many business organisations have expressed interest in adopting cloud solutions based on the potential benefits that cloud computing offers their organisation (Zardari, Bahsoon, & Ekárt, 2014). However, according to a survey conducted in South Africa by Akande and Van Belle (2014), only fifty-six percent (56%) of the one hundred Johannesburg Stock Exchange (JSE) listed

corporations surveyed in 2011 showed interest in cloud computing; forty-six percent (46%) had already adopted the new technology, and ten percent (10%) planned to adopt it within the next two years (Akande & Van Belle, 2014). The reviewed literature has shown that uncertainty and various challenges related to adoption have resulted in the rate of global adoption of cloud computing by business organisations to be lower than expected by the literature (Cohen et al., 2014).

### **1.1.2. Core business activities**

Core business activities are activities that are either,

1. Activities that are critical to the performance of the business organisation;
2. Activities that create or potentially create a competitive advantage
3. Activities that drive innovation and growth
4. Activities that have always been performed by the business organisation historically (Alexander & Young, 1996).

Akande and Van Belle (2014), and Howell-Barber et al.2013), found that the adoption of cloud computing by business organisations has tended not to be for core business activities but rather for non-core or support business activities.

### **1.1.3. Financial Industry**

The financial industry contributes 21% to the nominal GDP of South Africa. This is the largest contribution to the nominal GDP by any industry as classified by Statistics South Africa (Statistics South Africa, 2017). Based purely on its contribution to nominal GDP, the financial industry is an important contributor to the economic success of South Africa.

According to the JSE Industry Classification Benchmark (ICB), the financial industry consists of business organisations that operate in the banking, the insurance, the real estate, and the financial services sectors (Industry Classification Benchmark, 2017). Figure 1 graphically depicts the hierarchical classification structure of the JSE ICB financial industry.

A report released by Gartner in October 2011 anticipated that cloud adoption in the financial industry would start to move away from the non-core areas and begin to embrace core business activities (Gartner, 2011). However, by 2014 this was not the

case, as studies performed in both the United States of America and in South Africa found that cloud computing had never been fully implemented in financial business organisations. According to these studies, investment in cloud computing by business organisations within the financial industry has mainly been in the Software-as-a-Service (SaaS) model in preference to the other service models (Howell-Barber et al., 2013). Historically SaaS products invested in by business organisations were mainly of the non-core type, such as email systems and systems for customer relationship management (Akande & Van Belle, 2014; Howell-Barber et al., 2013).

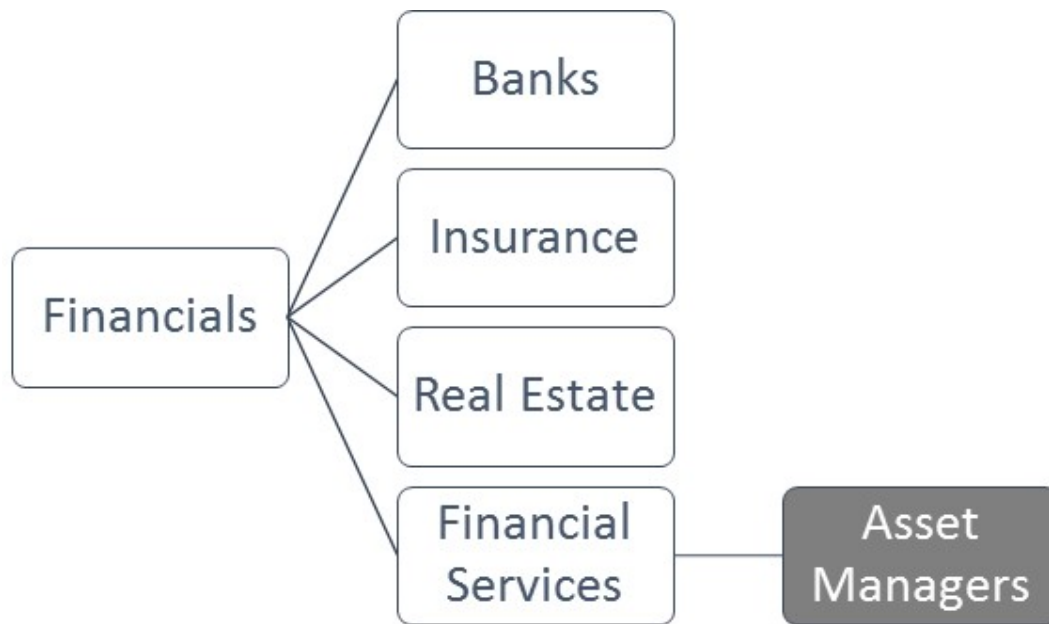


Figure 1: Classification structure of the JSE ICB financial industry

## 1.2. Problem statement

The findings of the literature reviewed for the study are summarised by the following statement; *Business organisations within the financial industry that have adopted cloud solutions have mainly adopted products that are not used in the core business activities of that business organisation.*

### 1.3. Research motivation

The motivation for this research developed from an interest in exploring and identifying the specific factors that have given rise to the tendency for business organisations within the financial industry not to adopt cloud solutions for use in core business activities. Thus, in order to conduct this research, instead of focussing on adopter or client factors that influence the limited adoption of cloud solutions by business organisations within the financial industry, this study focuses on the provisioning of cloud service solutions to the financial industry. Client side factors are not the only factors that influence the adoption of technology by business organisations; supply-side factors also influence this adoption of technology (Frambach, Barkema, Nooteboom, & Wedel, 1998; Waarts, Everdingen, & Hillegersberg, 2002).

This research study examines, and attempts to identify, the core challenge faced by cloud service providers (CSPs) of core business solutions by intentionally focusing on the supply side of cloud computing solutions for core business activities in the financial industry. Moreover, how this core challenge is resolved. The specific focus is on the provisioning of Software as a Service (SaaS) solutions. A major motivation for the focus on SaaS in this research is SaaS being the most popular cloud service model (Aleem & Sprott, 2012), as well as the researcher having an interest in exploring the reasons for this. Furthermore, this dissertation focuses on the main supply side factor, which together influence the adoption of SaaS solutions for core business activities. A classical grounded theory research method is suited to research which has the objective of understanding the nature of the core challenge to CSPs in provisioning SaaS products for core business activities in the financial industry, e.g. Adolph et al. (2012) posed a similar question in attempting to understand the core concern in software engineering. My research uses a case study to examine a particular CSP that offers a SaaS product to the financial industry. Thus, the specific focus is a SaaS product for a core business activity performed by business organisations in the investment management sector.

Therefore, because this research is concerned with what is happening with CSPs provisioning SaaS solutions for core business activities for the South African investment management industry, the initial research question for this study is: **What is the main concern for CSPs in provisioning SaaS solutions for core business**



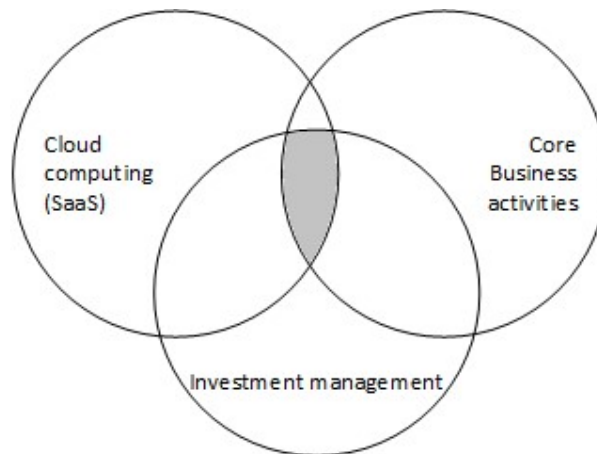
**activities for the South African investment management industry, and how is this concern resolved?**

By utilising grounded theory, this research study aims to answer this broad question of what the core concern is for CSPs, and how it is resolved.

This research is concerned with the provisioning of SaaS solutions for core business activities in the investment management industry, and therefore the literature review section in this study (Chapter 2) discusses the following key concepts or areas:

- Cloud computing with special emphasis on SaaS
- Core business activities
- Investment management and the core business activities of investment management

Figure 2 illustrates the points of intersection of these three key concepts, which constitutes the focus of this dissertation. The focus being the use of cloud computing for core business activities by investment managers.



*Figure 2: Intersection of key concepts as the research focus*

A further concept that this study explores in the literature relating to cloud computing is IT outsourcing, in particular the concept of cloud computing as merely an advancement of IT outsourcing, as some authors see it (Cloud Security Alliance, 2011; Cohen et al., 2014; Xin & Levina, 2008). Therefore a detailed description and discussion of outsourcing, specifically IT outsourcing, is required, particularly as cloud computing is widely understood to be the latest version of IT outsourcing. A second motivation for considering literature dealing with outsourcing is that outsourcing is a

key concept discussed in the literature on both cloud computing and core business activities (Harland, Knight, Lamming, & Walker, 2005; Hätönen & Eriksson, 2009; Prahalad & Hamel, 1990; Yang & Huang, 2000; Yang, Kim, Nam, & Min, 2007). The assumption underpinning the research is that these key concepts are not discrete.

#### **1.4. Value of the research**

The literature review dealing with the four key concepts demonstrates that, while these concepts have experienced considerable coverage as concepts individually, the intersection between cloud computing, core business activities, IT outsourcing, and investment management is one that does not enjoy widespread coverage in the literature. The literature on cloud computing adoption has shown a tendency to be concerned mainly with the individual factors that influence the adoption decision made by clients. Additionally, as has been mentioned, most of the literature reviewed focused only on the utilising of cloud computing and SaaS solutions for non-core business activities. The current study found very few articles that discussed cloud computing for core business activities, and these articles were found to be concerned with the client's perspective only, to the exclusion of that of the CSP. Therefore, based on this researcher's knowledge, experience, and findings, it is felt that there exists a gap in the literature, both on the topic of cloud computing provisioning per se, and on the topic of cloud computing provisioning specifically for core business activities. This study attempts to address this gap by focusing on the core challenge faced by CSPs in the provisioning of their cloud computing solutions, an important research area which, according to the literature reviewed, has to date been overlooked. This research then takes this one step further by drawing attention to the provisioning of cloud computing specifically for core business activities. This researcher has not found any literature related to this specific area.

#### **1.5. Dissertation overview**

The dissertation consists of six chapters. The first chapter has provided a background to, and motivation for, the research. Chapter Two provides a discussion and analysis of the literature reviewed, including the four key concepts that are referred to throughout this dissertation. Chapter Three describes and discusses the research methodology employed by this research, classical grounded theory. Chapter Three

also provides further motivation for the use of grounded theory in this research study. Chapter Four provides a detailed description of the findings of the research, together with a detailed description of how the grounded theory methodology was applied in performing this case study. Chapter Five discusses the theory used to describe how CSPs overcome the core challenge experienced – the theory that was developed using the grounded theory method. Chapter Five also includes a secondary literature review on the core concern identified by this research study, as well as the reason why the developed theory is better suited in addressing the core challenge than that contained in the existing literature. The final chapter concludes this research study by providing a summary of the research, a discussion of the limitations of this study, and recommendations for further research.

## **Chapter 2: Literature review**

### **2.1. Introduction**

As specified in Chapter 1, this chapter presents a description and discussion of the initial literature reviewed for this research study. The literature reviewed focused on the four key areas that this research explores and discusses: core business activities, IT outsourcing, cloud computing and investment management. The review focused on the literature presenting the historical context of each of the four topics, a critical review of their characteristics, and outline of the key aspects of each focus area as it relates to this research. Each of the following four sections defines and discusses a key concept, which together form the focus of this study.

### **2.2. Core business activities**

#### **2.2.1. Core competency**

In a business organisation core competencies together constitute the collective knowledge that informs the organisation on how it should organise different technologies and production skills (Harland et al., 2005; Prahalad & Hamel, 1990; Saunders, Gebelt, & Hu, 1997). Core competencies are those competencies that allow for the creation of a unique and integrated system that reinforces an advantage over a business's competitors (Prahalad & Hamel, 1990). Core competencies allow business organisations to operate successfully in similar environments to their competitors by creating a sustainable competitive advantage (Prahalad & Hamel, 1990). Porter (1985) perceived a competitive advantage as allowing a business organisation to produce goods or services for its customers, either at a lower price or in a more desirable fashion than its competitors are able to. Only a handful of the many competencies that exist within a business organisation are combined and integrated to deliver value to its customers and are considered as being core competencies (Boguslauskas & Kvedaraviciene, 2015). According to Alm and Lowe (2003), one way to ensure the future market performance of a business organisation is to develop that business organisation's core competencies that provide a business organisation with opportunities to develop future commercial benefits based on its current core competencies.

A business organisation's core activities consist essentially of its core competencies (Boguslauskas & Kvedaraviciene, 2015). Alexander and Young (1996) defined core business activities as those business activities that:

- are critical to the performance of a business organisation
- create or potentially create a competitive advantage for a business organisation;
- drive a business organisation's innovation and growth
- the business organisation has historically always performed.

A core business competency or core business activity is that "thing" that the business does, or claims to do, better than any other business organisation (Dibbern, Goles, Hirschheim, & Jayatilaka, 2004). The literature reviewed has had the tendency to use the terms "core competence" and "core activity" interchangeably; for the purposes of this study we will refer to core activity.

### **2.2.2. Defining core activities**

For any business organisation, defining what activities are core to that organisation in terms of generating maximum revenue is inevitably a subjective process and can lead to a misunderstanding and confusion within the organisation if done and communicated incorrectly or imprecisely (Heikkilä & Cordon, 2002). In order to achieve maximum success in generating revenue, a small or young business organisation tends to do everything itself, but, as a business organisation grows, not every activity that it performs is a core activity, or relates directly to the generation of revenue. Activities such as HR, accounting, and IT, although necessary for the business to function, may not directly contribute to the business organisation's revenue or performance and thus would not be defined as core activities (Boguslauskas & Kvedaraviciene, 2015).

In terms of ensuring the generation of revenue, identifying core activities requires a business organisation to be clear about the criteria and characteristics of an effective core activity. One characteristic of such an activity/activities would be the potential of the activity to provide access to, and successfully compete in, various markets. The competencies that a business organisation has acquired in a particular market should equip the organisation with the expertise to enable it to participate in other markets.

Furthermore, these competencies, if clearly defined and developed, should enable the business organisation to be a market leader in all of the markets in which it participates.

Another criterion would be a core activity which makes it difficult for the business organisation's competitors to copy or imitate the activity. In this context, a business organisation's core competencies are those competencies that, were the organisation not in possession of them, would lead to future losses.

Another identifier of core activities are those activities that lead to customer benefits (Boguslauskas & Kvedaraviciene, 2015; Prahalad & Hamel, 1990). In this context there exists the possibility that changing environments can lead to former core activities no longer being perceived or operating effectively as core activities (Harland et al., 2005). The ability of a business organisation to clearly and accurately identify which activities and competencies are core to that business organisation at any one time is invaluable because it allows a business organisation, within a changing business environment, to focus on those specific core activities and core competencies when formulating business strategies.

As highlighted previously, a core activity is that "thing" that a business organisation does better than anyone else does, and provides for a competitive advantage over their market competitors. Therefore, focusing on their core activities allows a business organisation to maintain or increase their competitive advantage over their competitors (Heikkilä & Cordon, 2002).

Once its core activities have been identified, a business organisation should treat these core activities as an important resource within the business organisation. This should involve the allocation by the organisation of these core activities within the organisation in such a way as to maximise their benefits to the organisation (Prahalad & Hamel, 1990). Any business organisation that is unable to clearly identify their core competencies is risking bankruptcy and should consider ceasing business and/or starting a new business that enables the organisation to clearly identify their core competencies (Boguslauskas & Kvedaraviciene, 2015).

### 2.2.3. Controlling core activities

Several authors see the prevailing paradigm in both IT outsourcing and cloud computing to be that of a business organisation that wants to be successful needing to outsource everything except those activities which it identifies as being core activities (Harland et al., 2005; Hätönen & Eriksson, 2009; Prahalad & Hamel, 1990; Yang & Huang, 2000; Yang et al., 2007). The main reason given for this persisting idea is that, by keeping its core business activities “in house” the business organisation is able to remain in control of, and focus on, its core business activities (Boulaksil & Fransoo, 2010). An activity cannot be classified as being core by a business organisation if that business organisation does not own and control that activity; this is further reinforced by the notion that a business organisation is characterised by its core activities (Alm & Lowe, 2003).

Boguslauskas and Kvedaraviciene (2015) thus see a core activity as being directly linked to the profitability and longevity of a business organisation due to the fact that the ability of the business organisation to remain competitive is fuelled by its core activities. Mehta and Peters (2007) see a major risk attached to outsourcing those activities that utilise the core capabilities of that business organisation as being the potential for the organisation to dilute this activity within the organisation (Mehta & Peters, 2007).

Research conducted in other economic sectors, such as the pharmaceutical sector, has identified core business activities that are being outsourced (Boguslauskas & Kvedaraviciene, 2015; Mehta & Peters, 2007). A trend in research and development of pharmaceutical companies has shown them basing their decision on this on an attempt to cut costs and reduce the time it takes to bring new products to market. Thus they have started outsourcing activities that historically have been considered core activities. Insourcing certain core activities for smaller pharmaceutical business organisations has not been an option, given the costs of these activities (Mehta & Peters, 2007). One reason for the outsourcing of what have been historically core activities in the pharmaceutical sector is that pharmaceutical business organisations no longer consider these activities as being core business activities, but rather as part of a key business process (Boguslauskas & Kvedaraviciene, 2015). A significant development emerging from this trend is that the healthcare sector in the United

Kingdom has shown itself open to outsourcing activities that are considered core to the services that they offer (Harland et al., 2005).

## **2.3. IT outsourcing**

### **2.3.1. Historical background of outsourcing**

Research has traced the concept of outsourcing as far back as the Roman Empire. The Romans performed a version of outsourcing when they 'outsourced' the collection of their taxes across the Roman Empire (Kakabadse & Kakabadse, 2005). Dibbern et al. (2004) define outsourcing as the usage of parties external to an organisation to perform activities previously performed by parties internal to the organisation. It was during the 1970s that outsourcing gained popularity in business organisations, when manufacturing organisations began to increasingly utilise other business organisations to manage processes that they identified as being non-core or less essential (Corbett, 2004). Prior to the 1970s, business organisations in all industries owned and controlled every aspect of their value chain (Hätönen & Eriksson, 2009). Since then outsourcing has become an important strategic tool used by business organisations due to the fact that business organisations believe outsourcing results in cost reductions, improved quality, and improved product or service delivery (Ghodeswar & Vaidyanathan, 2008; Kakabadse & Kakabadse, 2002). Outsourcing was increasingly found to enable business organisations to focus on and improve core business activities (Johnston, Abader, Brey, & Stander, 2009). Business organisations like IBM, for example, have changed their core business from building computers with their own components and operating systems, to selling services and computers. IBM has been able to do this by outsourcing the production of computers, together with the supply of components and the development of operating systems, to outside business organisations (Hätönen & Eriksson, 2009).

The popularity of outsourcing by business organisations increased so rapidly over three decades that, by 2004, the average manufacturing business organisation was outsourcing between 70% - 80% of its product to outside business organisations (Corbett, 2004). This growth in popularity of outsourcing up to 2004 happened over three distinct phases. Phase one, which ran from the 1950s to the end of the 1980s, was a period during which the major driving force for outsourcing was to cut costs.



Phase two, which began in the early 1990s, fed off the success stories from phase one. Business organisations, inspired by literature/research at the time, began increasingly to outsource non-core business activities (Hätönen & Eriksson, 2009). The Harvard Business Review reported in 1997 that outsourcing was one of the greatest management ideas of the century (Sibbet, 1997). The third and final phase, which began in the early 21<sup>st</sup> century, showed outsourcing to have become so pervasive – and thus equalising - that it no longer provided/provides a competitive advantage to business organisations. This new phase of outsourcing affords any business organisation the opportunity to be more competitive by enabling the organisation to transform itself. The motivation driving business organisations to outsource during phase one was to cut costs; phase two focused on core activities and on acquiring non-core competencies. Phase three offers business organisations the opportunity to be more flexible than in the past: it provides them with the capacity to react to changing environments by not needing to be too concerned with established internal structures (Hätönen & Eriksson, 2009).

### **2.3.2. Benefits and risks of outsourcing**

There are several ways in which outsourcing can benefit business organisations. One of the benefits is that it enables business organisations to be more flexible in the face of rapid change, and it also reduces the risks which come with technological and other changes, thus allowing a business organisation to focus strategically on other aspects of its business. Outsourcing to service providers who have expertise and experience in utilising new and advanced technologies provides business organisations with access to advanced technologies and concomitantly the opportunity to potentially improve their service levels. Another benefit of outsourcing is the opportunity it provides an organisation to access specialist skills. However, in spite of the increasing benefits of outsourcing, several risks remain.

One of the risks has been the differences between the actual benefit to the business organisation compared to the perceived benefit. Another risk relates to the ability of the third party service providers to achieve the agreed upon service levels. Internal risks include the effect that outsourcing could have on the morale of employees who feel that their ongoing employment is at risk. Another internal risk is the loss of certain

skills associated with particular activities being lost by outsourcing certain activities (Belcourt, 2006).

Business process outsourcing (BPO) is a new phenomenon, which refers to the outsourcing of specific processes performed by business organisations to outside service providers. Outside or third party providers either offer services to business organisations at a lower cost to the business organisation or are able to perform the business process more efficiently (Boguslauskas & Kvedaraviciene, 2015). One such outsourced business process is Information Technology.

### **2.3.3. IT outsourcing**

IT outsourcing (ITO) is a form of outsourcing where a business organisation purchases from an external party an IT good or service which had previously been provided from within the business organisation (Saunders et al., 1997). IT service providers are able to offer value to business organisations because the IT service provider's product or service offering benefits from economies of scale and is therefore being offered at a lower cost than the business organisation can realise if they provided this good or service themselves. Another motivation for IT outsourcing is that the IT service provider has a specialist skill or activity in the good or service on offer, which the business organisation does not possess, or possesses to a very limited extent, and would thus incur additional costs in acquiring the skill or activity (Boguslauskas & Kvedaraviciene, 2015). Gurbaxani (2007) defines IT outsourcing as a long-term agreement between a business organisation and one or many external IT service providers to manage part of or all of the IT operations and IT infrastructure of a business organisation. Thus there exists wide agreement in the business sector that IT outsourcing creates or adds value to the business organisation utilising it (Koh, Ang, & Yeo, 2007). Business organisations are also more willing outsource their IT function if the cost benefit of outsourcing is greater than that of doing it internally (Cho & Chan, 2013).

Literature published during the 1990s, and already mentioned in the previous chapter, attempted to answer the question of what function or activity should be outsourced by evaluating the concept of core activities (Hätönen & Eriksson, 2009). Several advantages emerged from this early literature, and from subsequent literature regarding the outsourcing of this particular activity. In those business organisations

which are more willing to outsource their IT, many senior executives identify IT as an important function and not a core activity (Dibbern et al., 2004). Dibbern et al. (2004) state that, by outsourcing the IT function, business organisations are able to concentrate their strategic focus on what a particular business organisation can do better than its competitors can do; in other words, to identify, prioritise, and concentrate their focus on their core business activities. Another motivation for the outsourcing of IT by business organisations is the lack of knowledge and/or ability of senior executives to recognise fully the value that IT provides their business organisation. In addition, there are senior executives who see IT as merely a cost centre that needs to be minimised in the same way any other expense or overhead is (Dibbern et al., 2004).

The various reasons for business organisations to initiate IT outsourcing can be summarised as the desire of business organisations to reduce costs, free up resources for other long or short term activities, increase productivity, and enable the organisations to focus their attention and resources on core business activities (Cullinan & Xiaochuan, 2014; Harland et al., 2005; Yang & Huang, 2000). The key factors influencing whether or not a business organisation should outsource a particular activity are twofold: firstly, the cost-benefit result for the business organisation, and secondly, the quality of service that the service provider can offer (Cho & Chan, 2013). Amongst South African business organisations, which are the focus of this research, Johnston et al. (2009) found that the cost was the main factor influencing IT outsourcing. The authors found the other influential factor for IT outsourcing to be the desire of a business organisation to focus on core business activities (Johnston et al., 2009). A study conducted in the Netherlands showed that IT support, IT infrastructure, and software and application development are the IT services commonly outsourced (Silvius, Turkiewicz, Keratsinov, & Spoor, 2013). The research study conducted on South African business organisations by the aforementioned Johnston et al. (2009) found the network and hardware implementation as well as software development to be the most outsourced IT functions. The literature identifying the risks attached to business organisations outsourcing their IT include the dependence on IT outsourcing service providers, resistance from IT staff within the organisation to IT outsourcing, and the possible loss of skill and expertise. A major additional risk is the hidden costs of IT outsourcing. These costs relate to identifying

the correct IT service provider and contracting with the service provider, migrating from internal IT services to the ITO service provider, the management of IT service providers, and the costs of transition after changes to the IT outsourcing agreement (Gonzalez, Gasco, & Llopis, 2005).

#### **2.3.4. IT outsourcing service provider**

Gurbaxani's (2007) definition of ITO as a long-term agreement between a business organisation and one or many external IT service providers was mentioned in Section 2.3.1. Silvius et al. (2013) develop and consolidate this idea by putting forward the concept of one key motivation for IT outsourcing being the relationship that exists between the business organisations outsourcing the IT service and the IT service provider. A model that analyses this relationship between a business organisation outsourcing its IT functions and an IT service provider is the maturity model for IT outsourcing relationships proposed by Gottschalk and Solli-Sæther in 2006 (Silvius et al., 2013). This three-stage model analyses the evolution of this outsourcing relationship between service providers and business organisations. The first phase of this model, the Cost stage, is the initial phase of the IT outsourcing relationship due to costs being the main motivation for IT outsourcing. Business organisations are motivated to outsource if there is a clear production cost saving benefit available. They are willing to outsource if an outside party can produce a product or supply a service at a lower cost than would be incurred if the business organisation were to produce it themselves. Thus, in other words, IT outsourcing agreements are contracts between business organisations and ITO providers. These contracts lay out formally, and in detail, the rights and responsibilities of both parties to the ITO agreement. The relationship that exists between business organisations and ITO providers during this phase is a formal agency relationship in which the ITO provider performs a service on behalf of the business organisation (Gottschalk & Solli-Sæther, 2006). Gurbaxani (2007) criticises IT outsourcing agreements from a transaction cost economics perspective. The argument is that transaction costs associated with IT outsourcing can erode and even outweigh the production cost savings that IT outsourcing offers (Gurbaxani, 2007).

Phase two of the maturity model is the Resource stage. According to resource-based theory, the uniqueness of the resources of a particular business organisation enables

it to benefit economically, and enjoy a competitive advantage. In this context IT outsourcing provides business organisations access to the resources of the ITO provider. Access to these provider resources potentially offers business organisations opportunities to innovate and improve (Gottschalk & Solli-Sæther, 2006). Business organisations, by relying on the resources of providers, can concentrate on their own core competencies and utilise their internal resources in an optimal manner that can in turn lead to economic benefits (Silvius et al., 2013). Only once business organisations are able to fully benefit from ITO provider resources and focus internally on their core competencies can the relationship between the ITO provider and the business organisation transition to the final phase, namely the Partnership stage (Gottschalk & Solli-Sæther, 2006).

An important factor contributing to the success of an IT outsourcing agreement is a mutual understanding between business organisations and ITO providers (Kishore, Rao, Nam, Rajagopalan, & Chaudhury, 2003). ITO providers and business organisations are able to collaborate in ensuring that both parties achieve their goals (Silvius et al., 2013). This stage is characterised by trust between the two parties, mutual understanding, and shared goals between the business organisation and the ITO provider (Gottschalk & Solli-Sæther, 2006). A successful engagement between business organisations and ITO providers requires that these two parties treat the relationship that exists between themselves as a relationship based on mutual respect, trust, and benefit, instead of a simple contractual arrangement (Kishore et al., 2003).

## **2.4. Cloud computing**

### **2.4.1. Background**

The most commonly used definition for cloud computing is that supplied by the National Institute of Standards and Technology [NIST] (Mell & Grance, 2011) which defines it as a self-service on-demand computing model that enables users to conveniently access a shared collection of configurable computing resources over a network. However, Gong, Liu, Zhang, Chen, and Gong (2010) argue that, since the NIST definition is one of many definitions of cloud computing, it would be more useful to focus on the main characteristics of cloud computing than trying to adopt a specific definition. Focusing on the characteristics as an exercise is not as easy as it seems

because there exist as many different lists of characteristics of cloud computing as there are definitions. Some of the various characteristics that various authors have provided over the years include agility, allocation and scheduling, application drivers, and broad network access. Further characteristics are capacity, location independence, failure management, interconnection, while measured service, multi-tenancy, on-demand self-service, rapid elasticity, reliability, resource management, scalability and elasticity, security and privacy, service negotiation, single system image, size/scalability, standards and interoperability, and user management are additional characteristics provided over recent years (Mell & Grance, 2011; Gong et al., 2010; Buyya, Yeo, Venugopal, Broberg, & Brandic, 2009)

Farber (2008) describes how the then CEO of the Oracle Corporation, Larry Ellison, criticises cloud computing by noticing this plethora of definitions and characteristics. According to Farber (2008), Larry Ellison is quoted as saying that, by just looking at the definitions and characteristics of cloud computing, one would be tempted to think that cloud computing was exactly “everything that we already do” and that cloud computing is nothing more than the latest buzz word. Reading through the vast array of characteristics highlighted above it would be very difficult to argue with Larry Ellison’s idea that cloud computing is something that has not been done already in IT. Cloud computing has been viewed by some authors such as Cloud Security Alliance (2011), Cho & Chan (2013), Lee, Chae, and Cho (2013), Shimba (2010), as well as Venters and Whitley (2012), as the latest iteration of IT outsourcing. Other authors have identified differences between the two and believe that the cloud computing and IT outsourcing should not be seen as the same thing (Dhar, 2012). Whatever assessment one holds of cloud computing, what cloud computing has done is that it has transformed the traditional IT outsourcing approach (Cho & Chan, 2013; Dhar, 2012; Xin & Levina, 2008).

#### **2.4.2. Key principles of cloud computing**

Janakiram (2012) identifies three key principles of cloud computing he considers to have tremendous benefits for business organisations: Elasticity, Pay per use, and Self-service.

#### **2.4.2.1. Elasticity**

Elasticity refers to the ability of the cloud solution to scale as and when required and to do so rapidly. Cloud computing offers the ability to its users to scale rapidly by its provision of a platform that can provide, configure and remove hardware when required (Venters & Whitley, 2012). Certain business organisations make the mistake of believing that the resources that cloud solutions are able to provision are unlimited and available at any time (Mell & Grance, 2011). The ability to increase a business organisation's IT infrastructure rapidly, and with little disruption to a business organisation, is the most important principle and benefit of cloud computing (Janakiram, 2012). Elasticity offers the promise to a business organisation of revolutionising how the organisation treats IT by offering improved affordability and a decrease in the time it takes to bring its products or services to market. This benefit to a business organisation can improve both its ability to innovate and its ability and potential to adopt new technologies (Venters & Whitley, 2012).

#### **2.4.2.2. Pay per use**

One highly useful benefit in terms of time and cost efficiency, and flexibility, emerges with cloud service providers providing business organisations with the opportunity to subscribe to cloud solutions and only pay for the resources they use (Chraibi, Hamid, & Abdelilah, 2013). A relationship between pay per use and elasticity exists, as it is important for business organisations to be consistently aware of the cost increasing or decreasing a business organisation's IT resources (Janakiram, 2012). With access to cloud service providers, the business organisation only pays for the service or infrastructure when it is required (Akanke & Van Belle, 2014). The benefit of this service to business organisations, especially small business organisations, is immense because it can reduce the initial cost of IT, which in most cases acts as a barrier or deterrent to entry (Janakiram, 2012).

#### **2.4.2.3. Self-service**

Another principle linked to elasticity in a business organisation is that of self-service. No human interaction from the cloud service provider is required in the provisioning of resources such as web applications, processing power or storage when the business organisation requires it (Youssef, 2012). The business organisation is in total control

of the provisioning of IT resources and is able to allocate resources when required (Mell & Grance, 2011; Dillon, Wu, & Chang, 2010). The benefits of self-service to business organisations is that when it requires to increase their IT resources they are able to do so timeously and without requiring to contact the CSP. There is very little effect on IT support and maintenance when a business organisation requires an increase in IT resources (Janakiram, 2012).

### **2.4.3. Cloud computing service models**

Cloud computing consists of three service models namely,

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Software as Service (SaaS)

#### **2.4.3.1. Infrastructure as a Service (IaaS)**

Infrastructure as a Service (IaaS) is the lowermost layer in cloud computing (Dhar, 2012). CSPs supply customers with the virtualised infrastructure which includes storage, networking, processing, and memory and, by means of this, customers are able to develop and deploy their software and applications (Dhar, 2012; Mell & Grance, 2011). CSPs typically operate large amounts of physical resources which include physical storage and processing capability. Through utilising virtualisation, CSPs are able to dynamically provision virtual resources to customers as and when required (Youssef, 2012; Vaquero, Roderio-Merino, Caceres, & Lindner, 2008). Customers adopting IaaS solutions are outsourcing their IT infrastructure requirements to a CSP (Yang, 2012). In this process the CSP manages and maintains the physical infrastructure, but customers have control over the virtual environment provided to them (Dhar, 2012; Mell & Grance, 2011).

#### **2.4.3.2. Platform as a Service (PaaS)**

Within the Platform as a Service (PaaS) cloud service model, a cloud service provider (CSP) provides the cloud-based environment to customers. Through this platform customers have the opportunity to access the cloud-based environment and to develop and deploy their own applications and software in this cloud-based environment (Mell & Grance, 2011).



Through the platform customers have access to programming languages, services, and tools that the CSP provides for the development and deployment of applications and software. The CSP is responsible for managing the cloud infrastructure, which includes the network environment, operating system and storage. Customers are responsible for managing their deployed application or software with potential access to manage the user configuration settings in the cloud infrastructure environment (Celar, Seremet, & Turic, 2011). The PaaS service model is one level of abstraction up from the IaaS service model. Under this service model, the CSP is responsible for the hardware and infrastructure, while consumers are able to develop, deploy and run the application or software (Vaquero et al., 2008). PaaS affords customers the opportunity to control the entire cloud software development lifecycle as they are able to design, develop and test their software on the provided cloud infrastructure (Dillon et al., 2010)

#### **2.4.3.3. Software as a Service (SaaS)**

The Software as a Service model offers customers a standard software package that is provided by a cloud service provider (CSP). The CSP manages the infrastructure and provides customers access to an application or a piece of software, and delivers this to the client through a thin client interface over a network (Singh, Patel, & Sahoo, 2014; Youssef, 2012; Xin & Levina, 2008).

Compared to other service models, the SaaS service model provides the customer with the lowest level of control as customers do not need to control or manage the underlying infrastructure, which can include the storage, network, and/or operating system (Singh et al., 2014; Dhar, 2012; Mell & Grance, 2011). In certain circumstances, customers are able to access and to make changes to user-specific application settings (Singh et al., 2014). A single set of code is the base of the software or application that is distributed on a one-to-many offering to customers (Xin & Levina, 2008). An advantage to business organisations of CSPs is that, because of the multi-tenancy, the application or software is able to benefit from being easily configurable and easily scalable (Youssef, 2012). This single set of code allows CSPs to maintain or update their software or application by rolling out updates or patches when required centrally, and once to the software, with very little disruption or downtime to clients (Vignos, Kim, & Metzger, 2013; Armbrust et al., 2010). SaaS is a further level of

abstraction up from IaaS, where both the hardware, infrastructure and the software are under the control of the CSP (Vaquero et al., 2008).

Customers have limited ability to change anything besides local user configurations (Mell & Grance, 2011) and are able to access SaaS on a pay per use basis as opposed to buying the software application, a facility which is appealing to some business organisations (Gon et al., 2010). In addition, business organisations are not locked into lengthy software licence agreements, and are not responsible for the installation, maintenance or upgrading of the software or application (Youssef, 2012).

#### **2.4.4. Benefits and risks of cloud computing to business organisations**

Cloud computing offers a number of advantages in terms of cost saving and cutting. One key cost cutting advantage for business organisations is the potential for cloud computing to lower the entry costs for new entrants, in particular for previously excluded market participants, into markets that are heavily reliant on computer technologies (Gupta & Varshapriya, 2014; Venters & Whitley, 2012; Marston et al., 2011). This is due to the lower costs of IT resources in the form of previously expensive hardware and software, and human resources having to be required to maintain and operate the IT resources. This cost cutting can be achieved by effectively utilising cloud computing solutions (Vignos et al., 2013). For this reason, cloud computing offers a significant opportunity for the developing world to embrace technology at lower costs (Marston et al., 2011; Kshetri, 2010). The lowering of technology costs to business organisations benefits not only these organisations but also the economies in both the developed and developing world. By lowering the cost of their entry into markets, business organisations are able to contribute more to their country's economic development (Kshetri, 2010). The same lower cost of entry benefit that cloud computing offers business organisations, has the potential to accrue to national authorities (Marston et al., 2011).

Another advantage of cloud computing for business organisations in terms of minimising expenses is the potential of cloud computing for enabling the treatment of IT as an operational expense instead of a capital expense (Aleem & Sprott, 2012; Armbrust, et al., 2010; Cloud Security Alliance, 2011; Gupta & Varshapriya, 2014; Marston et al., 2011). This is realised and operationalised by the business organisation's immediate access to hardware resources without having to pay for

these resources upfront (Gupta & Varshapriya, 2014; Marston et al., 2011). The usage of resources is billed on a pay per usage model, which leads to this expense only being incurred when it is operationally required (Aleem & Sprott, 2012). The pay per usage model allows for the addition of required hardware as and when a business organisation requires it, and allows IT managers and business organisations to be in full control of their IT expenditure (Armbrust, et al., 2010).

However there are also perceived and actual risks attached to cloud computing. One of the main concerns regarding the security, privacy, and reliability of cloud computing has plagued this IT industry (Vignos et al., 2013). Security concerns on the part of both cloud computing service providers and of business organisations extend to concerns about network security and data security. In other words, the question has been raised in terms of how safe a business organisation's data are, given that they might be transmitted and stored outside of the physical control of the business organisation (Subashini & Kavitha, 2011). These concerns are all related to the business organisation's actual and feared loss of control of its data (Marston et al., 2011).

Concerns relating to the reliance of cloud computing on a constant internet and speedy internet connection have also been raised (Yang, 2012; Shimba, 2010). While cloud computing claims to provide reliable, scalable and readily available solutions to business organisations, there exists the danger of solutions being compromised if the network connectivity is discontinuous or slow (Akande & Van Belle, 2014; Cho & Chan, 2013). Besides internet and network connectivity risks, dependence on the service quality, availability and reliability of CSPs is a serious concern of business organisations, a concern that is sometimes exacerbated by weak service level agreement (Lee et al., 2013; Venters & Whitley, 2012; Marston et al., 2011).

A final risk to business organisations is the absence of formalised standards for cloud computing (Cohen et al., 2014; Howell-Barber et al., 2013; Lee et al., 2013). There exist to date no cloud computing standards for data storage, Application Program Interface (API) and connectivity (Leavitt, 2009). This lack of standards leads to very limited interoperability between different CSPs within a single business organisation (Gangwar, Date, & Ramaswamy, 2015). (Gupta & Varshapriya, 2014) has stated that

this lack of standards has been a reason for the reservations and criticisms expressed regarding security and privacy of cloud computing.

#### **2.4.5. Business organisation adoption factors**

The extent to which a business organisation possesses an existing or up-to-date knowledge of, and its staff competence in – and a favourable attitude towards - cloud computing has an effect on the adoption - in terms of willingness and speed - of cloud computing adoption (Cohen et al., 2014). This can be explained by studies that have utilised a Technology Acceptance Model (TAM) framework to show the influence the ease of use has on an organisation's willingness and/or intention to adopt cloud computing (Oliveira, Thomas, & Espadanal, 2014; Pinheiro, Aparicio, & Costa, 2014). An adoption factor that relates specifically to staff is the influence and direct effect that the support of senior management has on the adoption of cloud computing, in terms of management creating an appropriate environment for the adoption of new IT (Cohen et al., 2014; Oliveira et al., 2014; Cho & Chan, 2013). An effort to combine the Technology Organisation Environment (TOE) framework with the human element by Lian, Yen, & Wang (2014) highlights the significant impact that the human dimension has on cloud computing adoption.

The quality of cloud solutions is a further adoption factor which has been identified in the literature. Quality concerns relating to security, privacy, reliability and service levels have been raised by several studies and articles in the literature (Cho & Chan, 2013; Khajeh-Hosseini et al., 2012). The perceived quality of service on the part of an organisation and its staff is an important factor influencing the organisation's decision to adopt, given the reliance that a business organisation would have on an efficient and secure implemented cloud solution (Lian et al., 2014; Zardari et al., 2014; Cho & Chan, 2013; Shimba, 2010).

Researchers of cloud computing have referenced various frameworks and theories in attempting to identify and evaluate cloud computing adoption. Frameworks utilised in the literature reviewed are the Technology Acceptance Model [TAM] framework (Chen & Tan, 2001; Gangwar et al., 2015; Pinheiro et al., 2014; Wu, 2011). The Technology Organisation Environment [TOE] framework was utilised by various authors in evaluating cloud computing adoption (Akande & Van Belle, 2014; Gangwar et al.,

2015; Hsu, Ray, & Li-Hsieh, 2014; Lian et al., 2014; Low, Chen, & Wu, 2011; Oliveira et al., 2014). Further frameworks utilised in the literature reviewed are Human-Organization-Technology fit [HOT-fit] model (Lian et al., 2014), transaction cost theory (Benlian, Hess, & Buxmann, 2009; Cho & Chan, 2015) and diffusion of innovation [DOI] theory (Dos Santos & Peffers, 1998; Hsu et al., 2014; Oliveira et al., 2014). Cohen et al. (2014) made use of both Institutional Theory and Absorptive Capacity Theory in evaluating cloud adoption. Other frameworks used are such as theory of planned behaviour [TPB] (Hunsinger & Corley, 2013), unified theory of acceptance and use of technology [UTAUT] (Wu, 2011).

As discussed in Chapter 1, on the basis of what emerged from literature reviewed as part of this research study revealed that previous and relatively recent research has focused primarily on the adoption factors from the perspective of the business or individual making the adoption decision. This research study proposes a different perspective on the topic of cloud computing for business organisations: research focusing on cloud provisioning. As mentioned in Chapter 1, adoption of cloud computing by business organisations are influenced by supply-side or CSP provision factors.

## **2.5. Investment management**

The final focus area of this study is the investment management sector. As stated in Chapter 1, the financial industry is an important contributor to the economy of South Africa and the adoption of cloud computing solutions within this industry has been low. Furthermore, research has identified the adoption of cloud computing for core business activities as being almost non-existent. Figure 1 graphically represents the hierarchical classification structure of the JSE ICB financial industry, and identifies the investment management or asset management sector as being part of the financial industry. In attempting to answer the question as to why cloud adoption for core business activities within the financial industry is low, this research study performed a case study on a CSP that provisions SaaS solutions to the investment management industry for a core business activity. This section describes what an investment manager is and what their core business activities are.

Financial investing is the activity concerned with the utilisation of capital, during a particular time period, in order to increase an investor's wealth. Two types of investing exist: direct and indirect investing. Direct investing takes place when investors buy and sell financial assets and manage their investment portfolio themselves. Indirect investing occurs when investors buy and sell financial instruments offered by investment managers. When making use of indirect investing investors transfer the risks of investing to the financial institution and success is dependent on the investment manager's ability to understand the financial markets, manage the investment portfolio, and effectively and intelligently analyse the investment (Levišauskait, 2010).

The investment or asset management sector is a subsector of the financial industry in South Africa (Industry Classification Benchmark, 2017). As highlighted in Chapter 1 of this study, the financial industry contributes 21% to the nominal GDP of South Africa (Statistics South Africa, 2017). The key role of investment management is to support their clients in reaching their investment objectives by assisting their clients in the selection of investments (Bines, 1976). Investment managers perform the investment function on behalf of those who own and supply capital (Clark, 1981). The responsibility of an investment manager can be best understood by in terms of 'the duty of prudence' (Bines & Thel, 2016). Investment managers are expected to act with professional competence when managing the money of their clients (Bines, 1976) and to exercise the same level of discretion, prudence and intelligence that they would if managing their own investments.

### **2.5.1. Core investment management activities**

The Investment Management process consists of three major activities: planning, executing and monitoring. The planning activity involves the analysis of an investor's risk and return profile. Understanding the needs of the investor(s) and their needs is a key activity in the investment management process (Kaplan Inc, 2016). The investment manager's goal is to achieve the investor's needs by combining assets and securities in an optimal manner (Brentani, 2003). During the execution activity the investment manager analyses the risk and return profiles of various investment types with the aim of deciding how to invest the investor's capital (Kaplan Inc, 2016). The investment manager needs to absorb a large amount of information available to them

and to transform all this information into investment decisions (Brentani, 2003). The final activity in the investment management process is the monitoring step. During this step, the investment manager needs to observe changes in investment assets and adjust the investment portfolio accordingly. Economic conditions are never static, and during the inevitable and often unpredictable changes to the economy, certain industries and business organisations risk and return profile changes. Thus investment managers need to be able to sell less attractive investment assets and purchase investment assets that are more attractive (Levišauskait, 2010). During this monitoring activity, the investment managers need to measure the performance and risk statistics of the investment portfolio (Kaplan Inc, 2016). Portfolio performance measurement informs the investor and investment manager periodically how an investment is performing in terms of both risk and returns (Levišauskait, 2010).

Therefore, based on the major activities of investment management, the conclusion that can be drawn is that the core business activities for an investment manager are planning, executing, and monitoring (Kaplan Inc, 2016). It will be highlighted later, in Chapter 4 that the CSP being studied provides a SaaS solution that can be used during the monitoring activity performed by an investment manager. In other words, the CSP being studied provides a SaaS solution that can be used during a core activity performed by an investment manager

## **2.6. Conclusion**

The intersection between IT outsourcing and core business activities is evident from the literature reviewed for the current research study. The majority of the literature reviewed on IT outsourcing discuss core business activities and competencies. Most of the literature specifically states that business organisations could or should only outsource non-core activities or competencies (Boguslauskas & Kvedaraviciene, 2015; Prahalad & Hamel, 1990; Saunders et al., 1997; Yang et al, 2007; Yang & Huang, 2000). One of the key motivations for and benefits of IT outsourcing is that it frees business organisations up to focus on their core business by rendering the management of IT the responsibility of an ITO service provider (Cullinan & Xiaochuan, 2014; Harland et al., 2005; Yang & Huang, 2000). Hätönen and Eriksson (2009), in their review of 30 years of research and practice of outsourcing, identified a key

question that has not to date been satisfactorily or comprehensively answered by the literature: what should a business organisation outsource?

Of relevance to the motivation for, and the area of, the current research, was the discovery and identifying of a gap in the literature: most of the literature reviewed focused on the factors influencing the adoption and utilising of cloud computing and SaaS solutions for non-core business activities from the client's point of view. This focus was to the exclusion of that of the CSP. Little or no literature was found on cloud computing *provisioning* specifically for core business activities and the challenges relating to this.

In summing up, what emerged from the literature reviewed on cloud computing was, firstly, a working definition on cloud computing as the complete or partial outsourcing of a business organisation's IT to a CSP. The literature described and discussed certain benefits that IT outsourcing offers business organisations, such as lower costs, and the ability to focus on the core and quality of product or service, benefits which are realised with cloud computing, together with certain benefits unique to cloud computing, such as elasticity and multi-tenancy (Dhar, 2012).

The literature also showed that the adoption of cloud computing by business organisations has to date been lower than expected by researchers, and the majority of cloud computing solutions being adopted are shown to be for non-core or support business activities. In addition, the lack of research, both on cloud computing for core computing, and on CSP challenges, is clear from the literature reviewed.



## **Chapter 3: Research methodology**

### **3.1. Research objective**

Chapter 1 outlined the main objectives of this research as: (1) to identify the main concern that CSPs face in provisioning SaaS solutions for core business activities for the South African investment management industry, and (2) to establish how this concern is resolved. A classical grounded theory research method is appropriate for this type of research objective (Adolph et al., 2012). A case study analysis aimed at exploring and understanding the core challenges to CSPs in provisioning SaaS products for core business activities in the financial industry and how it is resolved was conducted.

### **3.2. Grounded Theory**

The Classical grounded theory method (CGT) used in this research is one that prescribes and guides the researcher on how to move from the collection of data to the development of a theory (Glaser, 1999). The theory developed is based on a research methodology that inductively generates theory (Evans, 2013), and is “grounded” in the data collected and analysed (Matavire & Brown, 2013).

#### **3.2.1. Philosophical reasoning**

The objective of this research is to explore the main challenge faced by CSPs in SaaS provisioning and how this challenge is resolved. It is the perception of this researcher that this challenge is subjective and shaped by social interactions between the actors (business organisations and CSPs). In other words, the reality that CSPs face is constructed by their interactions as well as their experiences with their environment and other actors (Weber, 2004). This is aligned with subjectivism, which is the ontological view of this research. Ontology is the study of the nature of existence or the nature of reality (Kroeze, 2010). The research is interpretive due to the subjective nature of the research conducted. Only by interacting with CSPs and understanding the meaning that CSPs assign to this topic can this research gain true knowledge and understating of this subjective topic (Orlikowski & Baroudi, 1991).

Grounded theory begins with the gathering of data and then, by utilising a systematic process, as has been described, a theory is developed that is grounded in the data collected (Adolph, Kruchten, & Hall, 2012; Cooney, 2010; Matavire & Brown, 2013; Van Niekerk & Roode, 2009). Grounded Theory is, therefore, a methodology that prescribes specific and systematic ways of moving from the collection of data to the development of a theory from the data (Glaser, 1999). Grounded theory is suited for research studies attempting to investigate a specific area of concern (Van Niekerk & Roode, 2009). When performing a grounded theory study a researcher gathers data in the research area and generates a theory grounded in the data (Adolph et al., 2012). Grounded theory is appropriate in research studies where the aim is to create a theory about, and emerging from, the issues that exist, and have been identified, in the research area (Tan, 2010).

### **3.2.2. Why use grounded theory?**

The aim of this research is to provide a new perspective on a topic that has hitherto not enjoyed much attention. Grounded theory methodology (GTM) is particularly suited to areas of research not studied, or fairly superficially studied, previously, and/or where a new perspective on an existing area of research is required (Adolph et al., 2012). The stated objective to address an observed lack of literature on the topic of SaaS provisioning by CSPs, and the use of GTM complement each other as the current research focuses on an area that has not to date been studied in any depth - SaaS for core business activities. Thus the study uses a new and different perspective from previous studies by focusing on the CSP provisioning SaaS for core business activities. By making use of GTM, this research aims to uncover and address the core concern faced by CSPs. While in the current study, the identified concern is based solely on the data obtained using GTM during the data collection, other approaches require data collections that need to support a specific, pre-defined theory (Goede & de Villiers, 2003). GTM begins with the gathering of data and then, by utilising a systematic process, as has been described, a theory is developed that is grounded in the data collected (Adolph et al., 2012; Cooney, 2010; Matavire & Brown, 2013; Van Niekerk & Roode, 2009). Utilising a grounded theory approach enabled an exploration of the real and specific challenges faced and how these challenges are resolved by

CSPs in providing SaaS solutions for core business activities in the South African investment management industry.

### **3.2.2.1. Background of grounded theory methodology**

Sociologists, Barney Glaser and Anselm Strauss, jointly developed the Grounded Theory Method (GTM) in the 1960s (Urquhart & Fernández, 2013). Their idea and aim was to expand and consolidate the ability of social scientists to generate theory specifically relevant to their research (Van Niekerk & Roode, 2009). The Grounded Theory method is therefore a methodology that prescribes specific and systematic ways of moving from the collection of data to the development of a theory from the data (Glaser, 1999). GTM is comprised of systematic techniques for both the collection and analysis of data (Matavire & Brown, 2013). The methodology is called grounded theory methodology because once the theory is conceptualised, it is grounded in the data collected and analysed (Adolph et al., 2012). What makes the grounded theory approach different to other research methodologies is that it begins with an area of concern instead of with the usual research question that requires investigation and hypotheses that need to be verified (Van Niekerk & Roode, 2009). In grounded theory studies the researcher gathers data in the research area and generates a theory grounded in the data, rather than setting out with a preconceived theory or hypothesis which is then 'proved' or confirmed by the data and data analysis (Adolph et al., 2012). GTM is appropriate in research studies where the aim is to create a theory about, and emerging from, the issues that exist, and have been identified, in the research area (Tan, 2010). The two founders of grounded theory method each went on to develop their own grounded theory method separately, which led to very different and conflicting perspectives on how grounded theory method should be performed (Cooney, 2010).

### **3.2.2.2. Choosing Classical grounded theory**

Given that the stated aim of this research was to generate a theory that could both help to identify and explain the reality that exists within the research area, Table 1 clearly highlights the difference between CGT and SGT and shows that CGT is aligned to this objective. The decision to follow a CGT approach was based on the CGT principle of generating concepts and relationships that explain the behaviour regarding

a problem or concern in the area of study (Van Niekerk & Roode, 2009). In the case of the current research, CGT generated a theory that explained how CPSs overcome the core concern in provisioning SaaS solutions for the investment management industry

Table 1 below highlights some of the key differences between Glaser's classic grounded theory and Strauss's evolved grounded theory, as gleaned from the literature related to grounded theory (Cooney, 2010; Kelle, 2007; Matavire & Brown, 2013; Van Niekerk & Roode, 2009)

<b>Grounded Theory Themes</b>	<b>Classic Grounded Theory</b>	<b>Straussian Grounded Theory</b>
<b>Preconceived ideas</b>	No preconceived ideas	Paradigm Model
<b>Theory</b>	Emergence	Verification
<b>Reasoning</b>	Inductive	Deductive, Inductive
<b>Sampling</b>	Theoretical sampling	Theoretical sampling and guided by the research question and theory
<b>Coding</b>	Open, selective, and theoretical	Open, axial, selective

*Table 1: Classic grounded theory vs Straussian grounded theory*

### **3.2.2.3. Classical grounded theory (CGT)**

Classical grounded theory (CGT) is based on the original theory jointly developed by Glaser and Strauss during the 1960s (Evans, 2013). However Glaserian, or classical grounded theory (CGT), differs from Straussian grounded theory on how to approach data analysis (Cooney, 2010). Glaserian CGT directs researchers to conducting research without any preconceived ideas about the topic being researched: researchers should allow the actors participating in the research total freedom, and, in this process, allow the theory that 'explains', or starts to explain, the situation to emerge (Matavire & Brown, 2013). Classical grounded theory does not begin with a focused research question, but rather investigates an area in an attempt to uncover the main concern and its resolution (Matavire & Brown, 2013; Van Niekerk & Roode, 2009). The possession by researchers of prior knowledge, or preconceived theories/assumptions, of their subject matter was never a requirement of grounded

theory; instead grounded theory researchers are expected to put aside their pre-conceptions (Evans, 2013).

Thus CGT aims to develop theory that emerges from the data: any theme, or theory, that is not evident, or clearly emerging, from the data/data analysis should not be included in the grounded theory being developed (Van Niekerk & Roode, 2009). Both Glaser and Strauss were critical of the researchers of their time on the basis of their claiming to be verifiers of preconceived theory instead of generating new theoretical discovery in the process of their research (Kelle, 2007). Strauss has subsequently shifted his stance on this matter as discussed in the next section. Glaser on the other hand remained firm in this belief in emergence instead of verification (Matavire & Brown, 2013).

The use of a paradigm model in research has been argued by social scientists such as Glaser to lead to forced results, and it is for this reason that Glaser is opposed to the use of such a model (Matavire & Brown, 2013; Van Niekerk & Roode, 2009). CGT, according to Glaser, is inductive only and develops an emerged theory based on the data: it is inductive by nature (Cooney, 2010; Matavire & Brown, 2013; Van Niekerk & Roode, 2009). Thus grounded theory follows inductive strategies in both the collection and analysis of data (Charmaz, 2008).

CGT follows a theoretical sampling technique, where the researcher collects 'codes' and analyses initial data, and then, based upon the data collected and coded, and the theme(s) emerging from this process, decides what data to collect next (Adolph et al., 2012; Giske & Artinian, 2007; Hoda, Noble, & Marshall, 2012; Suddaby, 2006; Van Niekerk & Roode, 2009). With theoretical sampling, the researcher's sampling is selective, and the emerging theory guides future sampling (Van Niekerk & Roode, 2009).

CGT follows a well-defined process that moves from simple descriptions to theorising, referred to as coding (Hoda et al., 2012; Walker & Myrick, 2006). A very important aspect of CGT is how the data is analysed and how, from this analysis, a conceptual theory is developed; a theory that is based specifically on/'grounded in' the data collected and analysed (Adolph et al., 2012; Giske & Artinian, 2007). CGT includes three types of coding: open, theoretical and selective, which the researcher will subsequently have to perform iteratively (Matavire & Brown, 2013).

CGT introduces a method known as “constant comparison”, where the codes that are identified are constantly being compared to the data and against other emerging codes (Hoda et al., 2012). The idea is that the “constant comparative method” will lead to the researcher constantly coding new, or newly emerging, data and to the development of concepts (Giske & Artinian, 2007; Matavire & Brown, 2013).

### **3.3. Case study**

This research used a case study of a CSP that provisions SaaS solutions for core business activities in the investment management industry. A case study allows for an intensive study of a single entity, in this research, a particular CSP. The aim of this research, and of case studies in general, is to allow for the generalisation of the data from the single case study to higher order concepts and theory (Gerring, 2004). Case studies play an invaluable role in human learning as it is only through context dependent experience and knowledge that individuals move from being a beginner to being an expert in a field. Experts are able to operate at higher levels than beginners due to their personal knowledge of several cases in their area of expertise (Flyvbjerg, 2006). Furthermore, a case study acts as a boundary defining and limiting this research to a specific context and actor. In addition, the data collected from this case study will constitute the results of this research by detailing the core challenge experienced and how the core challenge is overcome by the CSP, and possibly experienced and overcome by other CSPs provisioning SaaS solutions for core business activities in the investment management industry (Saunders, Lewis, & Thornhill, 2009). The advantage of a single case study is that it is able to provide a deep understanding of the particular case being researched, whereas large sample studies tend to focus on the number of observations instead of the actual observation (Flyvbjerg, 2006).

#### **3.3.1. Data collection**

Data was collected by means of interviews, documentary analysis and observations of the CSP. Glaser (2012) stated, “All is data”, which meant that everything that is appearing in the research scene should be considered data. A researcher should make no distinction between interviews, documents or observations and that all information should be used for conceptualising (Glaser, 2012).

In-depth interviews with the various actors at the CSP were conducted to collect some of the data. By choosing to do in-depth interviews, this researcher considered these interviews to be able to provide the researcher with the best possible method to explore the topic. Due to the ontological and epistemological stance taken by this researcher, in-depth interviews were considered the most appropriate research environment for the participants to freely express and share their personal experiences, views, and knowledge on the area of research (Saunders et al., 2009). As stated previously these opinions and/or knowledge are subjective and can only be understood by attempting to understand the subjective and individual meaning that the participants assigned to them (Orlikowski & Baroudi, 1991). All interviews conducted were face to face and interview questions were based on semi-structured interview guidelines. The semi-structured interview guidelines were adapted from the research instrument utilised by Adolph (2013) in his CGT PHD thesis, which aimed to uncover the main concern experienced by software developers, and how they resolve it. The objective of this research was to identify the main concern experienced by the CSP in provisioning SaaS solutions for core business activities, and how they resolve it. It is similar to the study performed by Adolph (2013) in that both attempted to understand the main concern of a particular group of IT professionals and its resolution. Utilising this instrument allowed Adolph (2013) to uncover the core concern experienced and how this is resolved. This instrument of Adolph's (2013) has been adapted for the purpose of this research. The adaptations made to Adolph's (2013) research instrument included the rephrasing of certain questions that specifically referred to software development and rephrasing them to refer specifically to SaaS provisioning. Further adaptations were the omitting of certain questions that were not relevant to this research and substituting these with additional questions relating more specifically to the area of the current research. Myers & Newman (2007) describes a semi or unstructured interview as an incomplete interview script that requires the interviewer to improvise where required. Thus, the semi-structured interview used for the current study was both flexible and allowed for the rich collection of diverse data, which would not have been possible with structured interviews (Adolph, Hall, & Kruchten, 2008).

The research instrument (see Appendices E and F) underwent a pilot test in order to identify any flaws or weaknesses as well as to demonstrate the ability of the researcher and research instrument to acquire adequate data for this study (Turner, 2010; Van

Teijlingen, Rennie, Hundley, & Graham, 2001). The pilot study consisted of an interview conducted with a director of a software business organisation that provides solutions to the investment management sector in South Africa. The initial pilot test also provided the researcher with valuable practice in refining the interview technique and in improvising during the interview (Barriball & While, 1994). Using this adapted research instrument as a semi-structured interview guide allowed the author to identify successfully the key concepts and relationships that led to the development of a theory regarding the core concern and how it is resolved by CSPs.

Documents analysed included white papers and blog articles written by various staff members of the CSP. The documents were specifically on cloud computing and the SaaS solution that the CSP provisions.

Lastly, data was collected by means of observations made by the researcher of the CSP, a client business organisation and all of the interview participants' behaviour.

### **3.4. Research validity**

Validity is integrated within procedures for creating concepts in classical grounded theory (Glaser, 2014). CGT introduces the concepts of fit, work, relevance and modifiability as measures of validity (Giske & Artinian, 2007; Hoda et al., 2012; Lomborg & Kirkevold, 2003). "Fit" as a concept can be problematic depending on the ontological stance of the research. From a positivist point of view, fit is specifically concerned with the suitability of the generated theory in terms of the social reality, while fit utilising the "suitability" definition can be problematic to interpretivism due to the interpretivist belief that reality and truth are constructed, and that therefore any theory "fits" (Lomborg & Kirkevold, 2003). A compromise that CGT provides is in developing "theories that address the social realities of the actors in social settings" (Suddaby, 2006, p. 634). This approach aligns with the philosophical stance of this proposed research, interpretivism, and given that the objective is to develop a theory that will address the subjective realities of CSPs in provisioning core business software. Furthermore, to improve confidence in the findings of this research, a business organisation that utilises the CSP as a vendor was also interviewed so as to provide triangulation of the identified core challenge faced by CSPs and how it is resolved. "Work" refers to theories that are able to produce predictions or explanations



of the research area in question (Lomborg & Kirkevold, 2003). In the case of this dissertation, the theory developed “works” if it is able to explain the core challenge experienced by CSPs. The concepts of “relevance” and “modifiability” refer to a theory being developed that is relevant to the area under study and to a theory that can undergo changes as new data emerges (Lomborg & Kirkevold, 2003).

### **3.5. Confidentiality**

Permission was obtained both from the prospective CSP and from a client business organisation of the CSP to perform this case study. Prior to all interviews being conducted participants were sent an initial request to participate in this research. After this, an official letter introducing and providing information about the research was sent. The official letter stated that all participation is voluntary and that participants have the right to withdraw from the research at any time. The official letter also stated that all the information gathered would be regarded as confidential, and the names of the participants and their organisations would not be published in the findings of this research and subsequent reports – participants’ anonymity would be protected. Finally, prior to the commencement of each interview, participants signed a consent letter.

Appendices A, B and C provide copies of the initial email, official letter and consent form respectively.

### **3.6. Timeframe**

The timeframe for this research was cross-sectional as the research was concerned with identifying the main concern of CSPs at a point in time (Saunders et al., 2009).

## Chapter 4: Findings

### 4.1. Case study background

The previous chapter described the conducting of a case study on a CSP which provisions SaaS solutions to the investment management industry. The CSP selected for the case study mainly provisions as on-premises software solutions to the investment management industry, in both South Africa and the rest of the world. The CSP recently started provisioning cloud based software solutions as well to the investment management industry. The CSP has over 500 clients in 38 countries and offices around the world and includes countries such as Hong Kong, Australia, United Kingdom, United States of America, and South Africa. It is a multinational business organisation, with the group's main offices located in the United Kingdom and the United States of America, and has been offering its SaaS solution commercially to the investment management industry for more than 5 years. Another motivating factor for choosing this particular CSP is that there are not many other CSPs that offer cloud solutions to the investment management industry in South Africa. As has been mentioned, what sparked interest in this research topic was the fact that many other software vendors that provide software to the investment management industry are not provisioning cloud solutions.

As discussed previously in Chapter 1, within the investment management industry, the adoption of SaaS solutions has to date, focused almost exclusively on non-core activities such as accounting solutions and email. The core activities of investment managers, as identified in the literature in Chapter 2, include planning the investments that they make on behalf of their clients, executing the investment, and then constantly monitoring the investment. It is during the monitoring activity that investment managers are required to analyse both the investment portfolio, as well as the market, and they need to be able to adjust the investment portfolio accordingly so as to maximise the return earned and minimise the risk that the portfolio is exposed to (Kaplan Inc, 2016). In this context, in terms of core and non-core activities within the financial industry, business organisations have always classified their roles as either being front, middle or back office roles. The core activities identified of planning, executing, and monitoring fall within front and middle office roles. The tendency by business organisations across the various sectors that make up the financial industry has been

to outsource their back office functions. The motivation in most cases is to either cut operational costs or to outsource non-core activities and focus their resources on their core business activities (Tas & Sunder, 2004). The general view expressed in most of the outsourcing literature reviewed is that those business organisations that embrace outsourcing should outsource their non-core activities and remain in direct control of their core business activities. The perception gained by this researcher from the outsourcing literature reviewed is that, by outsourcing the back office activities and keeping the front and middle office activities in-house, financial business organisations are defining their front and middle office activities as being core business activities, or, at the very least, that they see these as being important activities that they wish to remain in control of.

The software that the CSP in question provisions to the investment management industry is software that is used during the analysis process of investment management. The suite of software solutions provisioned by the CSP includes specifically portfolio analytic solutions that are used in both the front and the middle office areas of investment management organisations. The suite thus includes software that is firstly used in the core business activity of investment analysis and investment monitoring process, and secondly, software that is used in business activities that are not outsourced by investment management organisations. The SaaS product that the CSP provisions is a cloud based platform that allows investment managers to analyse the performance and risk of their investment portfolios; it was launched commercially in 2011. There are several benefits offered by the SaaS product as marketed by the CSP. Firstly, it enables investment managers to reduce their operational costs by being able to control their IT expenditure. Another benefit to investment managers is that the round the clock and global availability of cloud based solutions means that, regardless of where in the world the investment manager finds him or herself, and regardless of the time, s/he has access to the data whenever they are required. For the CSP the costs of generating client reports are also reduced because the SaaS product allows for the generation of reports on a self-service basis directly from the platform. In addition, operational costs for the CSP are reduced. Because the product benefits from multitenancy, the CSP can easily support the single instance of the product.

Thus, given that the objective of this research is to explore and to understand the challenge faced and how it is resolved by a CSP in provisioning a SaaS product for a core business activity to the investment management industry in South Africa, the selection of this particular CSP as the business organisation to be used as the case study allowed this research study to fulfil its objective.

## **4.2. Data collection process**

### **4.2.1. Constant comparison and theoretical sampling**

Data was collected in four separate tranches. The first tranche of data collection, named data slice one, was the initial collection of data from three key individuals of the CSP being studied. The objective of this case study is to identify the core challenge experienced and how it is resolved by this particular CSP in provisioning their SaaS product. A product that is used in the core business activity of South African investment managers, the three individuals interviewed as part of data slice one were selected due to their importance to the CSP in its provisioning of its SaaS product. Glaser (as cited by Hoda et al., 2012) describes theoretical sampling as the process of collecting, coding and analysing data as well as serving as a guide for the researcher in deciding the sequence in which to collect what data during the collection process, depending on what data emerged and what their analysis showed. In line with the theoretical sampling process, data collected from each of these three participants was analysed immediately after they were collected. Data from each data source was analysed with the object of identifying incidents and assigning codes to these incidents. These incidents and codes from each data source from data slice one were compared with each other, and, from this comparison, certain concepts were identified by the end of analysing data from data slice one.

Based on the concepts identified during data slice one, during data slice two an interview was conceptualised and conducted with an IT manager from a South African investment management organisation which is a client of the CSP. Data collected from this interview was used to test and to verify the concepts identified from data slice one. Data slice two also provided new concepts that were in turn compared to concepts and incidents identified during data collection process slice one.

Data slice three involved documentary analysis of various documents obtained from the CSP. These documents included white papers and blog articles written by various staff members of the CSP. The data gathered from these documents was analysed using grounded theory data analysis processes. The data collected from this third data slice was then compared to concepts identified during data slice one and data slice two in order to verify these concepts. New incidents and concepts identified were compared to incidents and concepts identified during the previous two data slices.

Data slice four followed a similar process to that followed during data slice one, as described above. Data was collected from interviews with a further four participants. Data thus collected during this fourth slice was initially used to verify concepts, incidents and codes identified from previous data slices as well as data collected during data slice four.

The procedure for data analysis as prescribed by classical grounded theory was not strictly followed by the researcher while conducting this case study. Data were analysed and coded immediately after they had been collected from each data source/interviewee, but concepts were only identified and grouped after the completion of each data slice. This particular procedure was followed in order to focus the study on concepts identified by the key individuals at the CSP. These concepts were verified by comparing them with data collected from a client of the CSP and with documentation published by the CSP. Section 4.3.1 provides a summary of the key incidents identified across all four data slices.

#### **4.2.2. Data slices**

Details of each data slice, including the number of participants in each slice, the professional identities of each data source/participant and the types of documents examined, are presented in Table 2.

<b>#</b>	<b>Data Slice</b>	<b>Data Source Code</b>	<b>Description</b>	<b>Business Organisation</b>
<b>1</b>	1	Participant 1	Group Chief Executive Officer	CSP
<b>2</b>	1	Participant 2	South African Chief Executive Office	CSP

#	Data Slice	Data Source Code	Description	Business Organisation
3	1	Participant 3	South African Head of Development	CSP
4	2	Participant 4	Senior IT manager	Investment Management organisation
5	3	Document A	Business Lessons on Cloud computing	CSP
6	3	Document B	Cloud conversion lessons	CSP
7	3	Document C	Cloud conversion	CSP
8	3	Document D	Infrastructure costs and benefits to asset managers of cloud computing	CSP
9	3	Document E	Technology and investment management	CSP
10	3	Document F	SaaS vs Cloudwash	CSP
11	3	Document G	SaaS Product Sheet	CSP
12	3	Document H	SaaS Benefits	CSP
13	3	Document I	Cloud computing and self service	CSP
14	4	Participant 5	IT Risk Manager	Investment Management organisation
15	4	Participant 6	Product Manager	CSP
16	4	Participant 7	Product Architect	CSP
17	4	Participant 8	Development Team Manager	CSP

*Table 2: Summary of data collected*

Data slice one involved the collection of data from interviews with participant 1, 2, and 3. Participant 1 was at the time the Group Chief Executive Officer of the CSP who founded the CSP in 1994 after initially acting as an agent and selling IT solutions built by other business organisations to the investment management industry. Believing

before 1994 that he was capable of offering a product that “lots of companies wanted”, and that the use of technology could make complicated tasks for investment management organisations easier, participant 1, together with colleagues, built the CSP’s first software product. His understanding of the challenges that business organisations in the investment management industry were and are faced with, together with an appreciation of the benefits that IT brings, had been one of the reasons why participant 1 had been successful as the CEO of the CSP. This, together with a knowledge of the advantages that a SaaS product offers to business organisations in the investment management industry, and with scalability and benefits to his own business organisation in trying to provision products to the investment management industry, was the motivation for participant 1 walking into the office of the CSP and confidently announcing that “the cloud is the future”.

Participant 2 was the South African Chief Executive Office of the CSP and responsible for sales and growth of the CSP in South Africa as well as being involved in the CSP’s corporate strategy. Participant 2 was at the time responsible for the CSP operation in the Southern African region, which includes the CSP management of the software development team based in South Africa. The software development team in South Africa, together with the software development teams located in the United Kingdom and in Italy, are responsible for the development of the SaaS product that the CSP provisions. Participant 2 was also responsible for all sales and business development of the cloud solution being provisioned to investment management organisations in South Africa by the CSP.

Participant 3 was the Development Director for the CSP and the current chief IT architect for the group and for cloud products offered by the CSP. While the CSP has software development teams based in many of its international offices, the management of the South African software development team is the responsibility of participant 3. The South African based software development team is one of the many software development teams that contribute to the development of the SaaS solution that is provisioned by the CSP. Participant 3 was also contributing to the ongoing product management of all products by actively contributing to the functional and technical specifications of the various products. He had played an active role in the vision and development of the cloud solution being provisioned to investment management organisations.

Data slice two comprised of data collection from participant 4. Participant 4 was a Senior IT Manager for a South African based investment management organisation which is one of South Africa's largest investment management organisations with over R600 billion in assets under management. This participant was responsible for the system architecture within the investment organisation which is a client of the CSP and utilises many of the on-premises products that the CSP offers. To date this particular investment management organisation has not adopted the cloud solution being provisioned by the CSP.

As has been mentioned, multiple documents obtained from the CSP website were analysed as part of data slice three. Documents A, B and C are, respectively, a blog post and two articles written by participant 1 of the CSP. These documents detail the experience of the software vendor becoming a CSP from participant 1's perspective together with the lessons learned from the experience.

Documents D and E are white papers written by a director of the CSP and they discuss the cost benefits to investment managers of using cloud based solutions. These documents detail the high infrastructure costs incurred by investment managers utilising on-premises investment performance software as well as the benefits of scalability, adaptability, configurability, and enhanced security of cloud based solutions.

Document F describes the difference between SaaS and Cloudwash. According to this white paper written by the CSP, Cloudwash is where existing legacy software is placed in the cloud for users to connect and use. Although it is sold to customers as a cloud solution, it does not make use of all the benefits of a cloud solution, such as elasticity and multitenancy, as it has not been redesigned to run on a cloud platform.

Document G is a white paper published by the CSP in which it describes its SaaS solution and all the benefits thereof. The description includes the SaaS product being provisioned, a comparison between the SaaS product and on-premises products, and a case study of the SaaS product in use in order to highlight the benefits of the SaaS product.

Document H is an article published by participant 1 on the CSP website in which the benefits of a SaaS solution for both the CSP and investment managers are described.



These include cost benefits as well as the benefit of having software provided in the “best possible way”.

The final document reviewed in which the benefits of the SaaS solution being provisioned by the CSP were espoused was document I which, amongst other things, discusses the benefit of self-service and allowing clients to be in control of their data.

The final data slice involved collecting data from various participants from both the CSP and the client business organisation, both as a form of triangulation to verify incidents and codes identified from previous data slices as well as to uncover any new codes, if they existed. During this data slice data was collected from participant 5, the IT risk officer for the investment management organisation. Participant 5 was at the time responsible for managing and attempting to mitigate the risk associated with the ownership and operation of IT within the investment management organisation.

In addition, data was collected from three participants of the CSP: participants 6, 7 and 8. Participant 6 is the product manager of one of the three products that is being provisioned as part of the single SaaS product by the CSP and is responsible for the functional modelling and investment performance calculations of the product.

Participant 7 was the recently appointed IT architect for one of the SaaS products being provisioned by the CSP. The main responsibility of participant 7 was to “cloudify” the products of the CSP, which entails the deployment of all products to the cloud, as well as having to monitor and maintain the cloud solutions offered by the CSP.

Participant 8 was development manager of one of the development teams working on the SaaS product being provisioned by the CSP. This participant’s core duties involved technical reviews of development tickets of the SaaS product.

Figure 3 illustrates the process of constant comparison and theoretical sampling that this research study followed using grounded theory. This involved the collection of data from individuals representing the CSP, individuals representing a client as well as analysis of documents published by the CSP. Each round of data collection was followed by analysis of the data in terms of the coding processes as prescribed by classical grounded theory. Furthermore, data collected was analysed and compared

to data collected during previous data slices as well as that particular data slice. The analyses performed are described in detail in chapter 4.3.

In line with classical grounded theory (CGT), after each round of data analysis the research instrument, the semi-structured interview guide, was updated to include

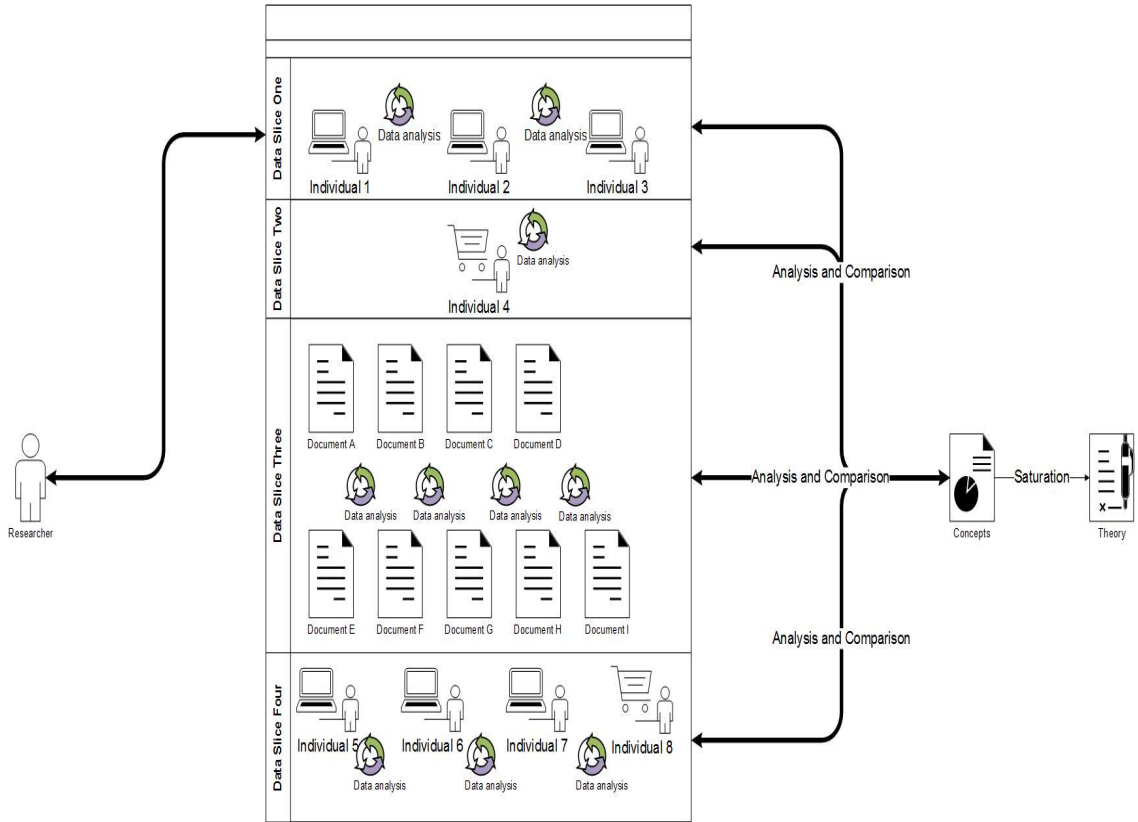


Figure 3: Constant comparison method adopted

questions relating to the key concepts identified in the preceding round of data analysis. The updated research instrument was then used in the subsequent data collection phases. Data was collected from three individuals from the CSP and after each phase of data collection, data analysis was performed. During the data analysis phase, the number of concepts reduced, or narrowed was distilled, until a core concept was identified. This core concept was then used during data collection in data slice 2 and data slice 4. During data slice 2 and data slice 4, when data were collected from a large South African client of the CSP as well as other employees of the CSP, this core concept together with other incidents and concepts which had emerged during the previous data collection phases was discussed. This was done in order to verify the core concept as identified.

While the researcher's perceived lack of CSPs offering SaaS solutions to the investment management industry for core business activities, and the desire to explore this, was a motivation for performing this study, it was also the most significant limitation of this study. After an exhaustive search, no other CSPs were identified in South Africa who were able to participate in this research study, and for this reason theoretical sampling, as prescribed by CGT, could not be employed fully.

### **4.3. Data analysis process**

As was described in detail in Chapter 3, grounded theory informs the process of moving from data collection to theory (Glaser, 1999) rather than starting with a preconceived theory or hypothesis to be 'proved' or confirmed by the data and data analysis. To illustrate how CGT data analysis was applied to this case study, and how this study moved from data collection to theory, this section begins with a description of the substantive coding process, a process consisting of open and selective coding. The section concludes with a detailed description of the theoretical coding process performed during this case study.

The section on substantive coding initially specifically highlights the various codes assigned to each incident identified. Every incident identified during the data analysis process has been assigned a code. Table 3 presents the top occurring codes identified, together with the incident that was used to derive that particular code. The section on open coding concludes with the codes being grouped into categories, and a full list of the categories is provided. Throughout the open coding phase the incidents, codes, and categories were constantly compared with each other with the purpose of identifying relationships. It was during this phase that a core category emerged from that data which had been collected and analysed. The section entitled "Selective coding" focuses on the core category, and on the relationship that exists between this category and the other categories. The final section describes the theoretical coding process and expands on the selective coding by describing the theory that underpins this relationship between the core category and the other categories.

#### 4.3.1. Substantive coding – Open coding

Substantive coding is separated into two distinct phases: open coding and selective coding. During these two phases, categories are produced and properties of these categories are revealed (Kenny & Fourie, 2015).

Data were analysed by reviewing each incident provided by interview participants on a line-by-line basis and assigning a code to each incident. Table 3 highlights the top occurring codes identified within the data collected together with a sample incident for each code. Occurrence refers to the number of times a code appeared in the data analysed, while recurrence relates to the number of participants that have indicated the relevant code. Codes that occurred more than 13 times in the data analysed have been included in Table 3.

Code	Sample incident	Occurrence	Recurrence
Client benefits	<i>"You don't give clients you know a thick client or even a thin client, just a zero client with a web browser. And that was very appealing because there is no installations you just go to the, you know, log in address out comes the page. You log in and you're in the system."</i>	42	15
Client cost sensitivity	<i>"This works quite well, so a smaller manager who has broken away from a large investment manager and have set up a little five-person operation and only have five portfolios, we can actually give them portfolio attribution for a fraction of the cost that it would cost a large investment manager."</i>	30	13
Client functionality	<i>"Cloud based solution the flexibility for us to deliver functionality to our clients, the calculation speed and power that we would have would be unbeatable versus an ordinary installed version software or mainframe based solutions. Far cheaper, far faster, far quicker."</i>	50	12

Code	Sample incident	Occurrence	Recurrence
Client IT environment	<i>"so you end up and then they're working on a slightly different version of Sequel Server or they've got a slightly different version of Windows or whatever and the combination of these things creates potential problems in environment that you couldn't anticipate in your bug testing"</i>	28	13
Client perception	<i>"... Fudd, fear uncertainty and doubt."</i>	28	9
Client processes	<i>"Their current batch on our platform runs for 17 hours, if they can drop that down to an hour. They gain for themselves a day and a half of daylight time."</i>	36	12
Client product strategy	<i>"given the ability well here's a solution. We can do it on premise or Cloud we'll go on .The only time we will go to a cloud is if there are major cost implications"</i>	34	9
Client profile	<i>"... we picked up these smaller guys on our cloud based platform"</i>	23	6
Client solution cost	<i>"You need hardware on your side; you need operations people, you know you need all these costs associated with running a piece of software and that essentially you are taking that away"</i>	16	12
Client Strategy	<i>"The people costs; the software costs; the IT costs just to operate your software is expensive"</i>	30	9
Competition	<i>"if you don't start now well your competitors might do it and be; you'll be stuck at the same problems because you always have installed software"</i>	14	8
CSP maintenance costs	<i>"at one point we had sixty percent of our development team working on bug fixing and supporting old versions and even putting new software releases into old version software rather than building the latest version"</i>	13	9

Code	Sample incident	Occurrence	Recurrence
CSP Product	<i>"We're not loyal to the software that we hold so as we speak now we'll be re- looking at ...systems not because we want to move, just to make sure that we still have best solutions available to us "</i>	20	6
CSP product development	<i>"So take the existing product not try re-write it from scratch, rather look at lifting out little pieces of it, and chipping away at the problem, and keeping it compatible all the time so that clients are able to move on to the newer versions essentially migrating them out of on-premises into Cloud; making that transition really smooth"</i>	50	10
CSP product strategy	<i>"...what we needed to do was to rewrite everything as a Cloud based product."</i>	59	8
CSP release and upgrade strategy	<i>"...is to get to continuous deployment or more correctly continuous delivery."</i>	39	14
CSP staff expertise	<i>"we employ a lot of people who are very expert in Maths bring people with Physics backgrounds"</i>	23	6
CSP strategy	<i>"But our strategy has been technology"</i>	47	9
CSP Technology stack	<i>"and as a result of that we have a quite a wide range of technologies and programming stacks and products that we look after and develop"</i>	14	5
Cultural change	<i>"I would say that the biggest challenge we face as a business that was traditionally doing installed software was the cultural shock of doing software as a service which it obviously is."</i>	22	8
Intellectual property	<i>"so that the workarounds and the way they use the software because yes once a client got some software they might have a specific use and they might have built you know a store procedure to do a certain type of report or analysis that they want to look at"</i>	13	7

Code	Sample incident	Occurrence	Recurrence
Modular	<i>"It is three separate products sold under the single sign on. So, we have an end to end integrated solution from your creation of the weights and returns of your portfolio through to your analytics and your risk"</i>	13	6
Multi-tenant	<i>"explained to me multi-tenant concepts and so got here was having a single set of code which everybody accesses so you don't install different code for different clients but you instead of having a single database for each client gets you get a multi-tenant database which is logically separated"</i>	18	11
Product architecture	<i>"The design of the architecture of product is very much one where its components you can pull the components out and replace them and put the new ones in it"</i>	16	8
Product benefits	<i>"The mandate was it needs to be fast; the data volumes that it needs to handle must be a 100 times what we were used to, if not a thousand times, and it needs to be modern in its user interface"</i>	19	11
Product version disparity	<i>"With installed software, especially with our kinds of expert software, we have let's say you know hundred and fifty clients with the same product and all of them are pretty much some kind of unique version"</i>	16	10
Revenue	<i>"So really when it got launched in 2011 people started believing in it but it was still very small but now it represents forty percent of the revenues"</i>	14	3
Sales	<i>"So typically we've made a lot of sales to people who have never had our products before therefore they couldn't compare it to one of our other products"</i>	18	6
Scalability	<i>"the data volumes that it needs to handle must be a 100 times what we were used to if not a thousand times"</i>	17	10

Code	Sample incident	Occurrence	Recurrence
Security	<i>"In trying in selling it to clients the biggest question every client has is question of security"</i>	24	13
Time to market	<i>"We've got at least a year (2016 + 1) to go before we can say we've really done it"</i>	15	7

Table 3: Codes identified from data collection and frequency of occurrence

The full list of all the codes identified within the data collected together with a sample incident is included in Appendix A.

These codes identified were grouped into the five categories. The first category identified is 'CSP business strategy'. This category is concerned with the codes that relate to changes in how the CSP conducts their business. The second category is 'CSP IT strategy'. The codes that deal with changes to the products being provisioned and how the products are created and provisioned are sorted into this category. Codes that describe the incidents regarding changes to how the client business organisation does business are be categorised under the 'Client business strategy' category. Incidents relating to how the client business organisation interacts with their IT products and services are classified under the 'Client IT strategy' category.

The business strategy of a business organisation guides the entire business organisation. The business strategy dictates the functional, operational, personnel, financial and information technology strategy (Smits, van der Poel, & Ribbers, 2003). IS strategy is defined as the use of IS to support business strategy (Chen, Mocker, Preston, & Teubner, 2010). The alignment of business strategy and IT strategy is an important issue for business organisations because IT has become a critical tool in accomplishing business strategy (Rathnam, Johnsen, & Wen, 2005).

Finally, the 'Migration' category relates to codes that relate specifically to the moving from one state to another. The grouping of codes identified into each category is represented in Table 4.

Category	Codes
<b>CSP business strategy</b>	<i>Client profile, Client size, Competition, CSP cost sensitivity, CSP history, CSP maintenance costs, CSP perceptions, CSP Product, CSP profile, CSP release and upgrade strategy, CSP staff</i>



<b>Category</b>	<b>Codes</b>
	<i>expertise, CSP strategy , Cultural change, Market saturation, Migration, Profitability, Revenue, Sales</i>
<b>CSP IT strategy</b>	<i>Connectivity, CSP cost sensitivity, CSP IT environment, CSP maintenance costs, CSP Product, CSP product development, CSP release and upgrade strategy, CSP Technology stack, Migration, Modular, Multi-tenant, CSP Product stack, CSP product strategy, Data jurisdiction, Intellectual property, Product architecture, Product dispersion, Product education, Product version disparity, Scalability, Security, Time to market</i>
<b>Client business strategy</b>	<i>Client benefits, Client cost sensitivity, Client functionality, Client history, Client IT environment, Client perception, Client processes, Client profile, Client size, Client solution cost, Client staff expertise, Client strategy, Competition, Control of data, Cultural change, Data jurisdiction, Migration, Security, User resistance</i>
<b>Client IT strategy</b>	<i>Client architecture, Client benefits, Client cost sensitivity, Client functionality, Client IT environment, Client processes, Client Product Stack, Client product strategy, Client solution cost, Client staff expertise, Connectivity, Control of data, CSP Product, CSP release and upgrade strategy, Cultural change, Data jurisdiction, Demonstrations, Elasticity, High availability, Industry Standards, Intellectual property, Migration, Product benefits, Product education, Security, Self-service, User resistance</i>
<b>Migration</b>	<i>Client architecture, Client functionality, Client IT environment, Client perception, Client processes, Client Product Stack, Client product strategy, Client solution cost, Client staff expertise, Client strategy, Connectivity, Control of data, CSP client relationship, CSP cost sensitivity, CSP IT environment, CSP maintenance costs, CSP perceptions, CSP Product, CSP product development, CSP Product stack, CSP product strategy, CSP release and upgrade strategy, CSP staff expertise, CSP strategy, CSP Technology stack, Cultural change, Intellectual property, Migration, Product architecture, Product benefits, Product dispersion, Product version disparity, Security, Time to market</i>

*Table 4: Categories identified from codes analysed*

The following section will introduce each category identified as well as discuss a few examples of the codes grouped into each category.

#### **4.3.1.1. Category 1: CSP business strategy**

Category 1 refers to all the incidents that relate to the manner in which the CSP conducts its business and its business strategy employed. As mentioned previously the business strategy guides the business organisation and it drives the functional, operational, personnel, financial and IT strategy of the business organisation (Smits et al., 2003). Some of the codes identified that were categorised in the CSP business strategy category are discussed below.

A participant was of the view that the shift from being an on-premises software provider to being a SaaS cloud service provider represents a fundamental change to how the CSP does its business. The CSP, which historically earned its revenue from “chunky” licence fees from large investment managers, has to adapt its business strategy to accommodate earning its revenue on a pay per use model:

***“It has changed the focus away from the institutional asset managers who pay us a large licence fee annually, to the smaller/intermediate, any asset manager who pays us on a per portfolio basis, on a real SAAS for those portfolios. The key being that we moved away from clients paying us chunky money and only being a couple hundred versus having thousands paying us small money”***

The CSP, which has a long history in the software business, and offers its software products to a large portion of the South African investment management space, has reached near market saturation. The costs of purchasing the CSP’s on-premises software is bundled with the cost of the infrastructure and staff required to operate the software. The SaaS solution being provisioned has led to an increase in smaller clients who historically could not afford the on-premises software. The typical time to market for new on-premises products was between six to eight months; the SaaS solution time to market is much longer. This delay in realising revenue could have an effect on the profits of a CSP as it invests capital in the development of a product that only really starts to sell after three or four years.

***“I would say that the biggest challenge we face as a business that was traditionally doing installed software was the cultural shock of doing software as a service which it obviously is. And I would say that I had huge numbers of battles internally to get people to take it seriously. When we finally delivered a prototype people began to start to believe”***

The responses and information received during the data collection process indicate that the perceptions of staff and of clients need to be managed, especially if any negative opinions exist regarding a cloud solution. Staff members and clients require education regarding the benefits of cloud computing and of the product so as to ease any concerns

#### **4.3.1.2. Category 2: CSP IT strategy**

Category 2 relates to the strategy employed by the CSP in developing and provisioning its various products. The IT strategy is how IT is perceived and used by within the business organisation (Chen et al., 2010). Two of the codes identified during the open coding that has been classified as CSP IT strategy are discussed here.

A participant highlighted the migration from utilising licensed development software to open source development software.

***“The mandate for making it more of a platform and also you know looking at the history of the company’s growing through acquisition. So we’ve got very different technology stacks. So you know South Africa was a Microsoft stack, now it is Open source; Ruby and Python. US is, is mainly Java. Europe is mainly Python and R as well and then in London is #C and .net and TSQL and Enterprise SQL.”***

The CSP had previously acquired businesses and the software and so were able to sell the newly acquired software quite easily to clients. The requirement to integrate the software into the existing product suite was not necessary to sell the software. The move to a SaaS solution requires that any new software acquired would need to integrate with the existing cloud platform, which is a major change to how products are provisioned for the CSP. This was a major issue experienced by the CSP:

***“So if you think of it in terms of the source code so now you’ve got two hundred clients and you maybe have twenty-two versions of your product out there. That means you got to have twenty-two branches in your source code to make sure you know what version everyone’s running. And so when client A asks for a fix, emergency critical has to be done tonight. Then you need to check out the exact source code of that client, and that then propagates the problem .So it’s expensive not only for the client, it’s expensive for the vendor because now you have extra difficulty and extra time wasted on this”***

Participants representing the CSP saw the challenge of maintaining numerous versions of on-premises software and supporting these different versions as being a costly and inefficient exercise for the CSP. Thus the benefits of multitenancy are all clients being able to be updated once, centrally.

#### **4.3.1.3. Category 3: Client business strategy**

Category 3 discusses the business strategy of the client business organisations. In the context of this research the client refers to investment managers. The overall business strategy of the client's business organisation is affected by adopting cloud computing. Codes that fall into the client business strategy are client benefits, client cost sensitivity, client functionality, client history, client it environment, client perception, client processes, client profile, client size, client solution cost, client staff expertise, client strategy, competition, control of data, cultural change, data jurisdiction, migration, security and user resistance. Client cost sensitivity and client benefits are further discussed below.

Investment managers running the CSP's on-premises software for the core business activity of portfolio performance measurement invest heavily in infrastructure and IT staff. The SaaS solution alleviates the cost of ownership as the solution is paid for on a pay per use model. Multiple participants described the particulars and the advantages of this cost-saving process:

***"It saves our clients huge costs. So it's also a lot cheaper for the clients and it's less complicated for the clients. Because when a client you know takes on hardware they have to manage their own hardware. It's incredibly expensive for them to operate those boxes with all the software on it and the networking and the maintaining and so on. The people costs; the software costs; the IT costs just to operate your software is expensive and it's not necessarily the area of competence."***

This clearly indicates that a key motivating factor for clients evaluating cloud solutions is cost which was further endorsed by another participant:

***"The motivating factor to move to the cloud is cost. And so generally we haven't moved because of cost yet, but we have looked at Cloud solutions to lower software costs, so when you start looking at your infrastructural cost, and looking after stuff***

***on-premises, as opposed to moving stuff into cloud, that's the sort of analysis that we'll be looking at"***

The business processes that the investment manager has, and operates with, especially those around its core business activities, are long standing and entrenched. Any changes to the processes, both improvements and deteriorations, have an effect on how the investment manager performs its core business activities. Positive changes such as lower costs and improved productivity have direct benefits for business organisations.

***"One of the biggest constraints in an asset manager's life is the first 5 days of the month where they need to get all their reports done. All the batches done... you can throw resources and reduce your batch to whatever you want. A client's current batch on our platform runs for 17 hours; if they can drop that down to an hour they gain for themselves a day and a half of daylight time."***

#### **4.3.1.4. Category 4: Client IT strategy**

The client IT strategy is the fourth category and this relates to the IT strategy employed by the client business organisation. The IT products and services that the client business organisation employs during its normal business operations.

Several participants expressed the view that the products employed by investment managers, especially software used for core business activities, need to have a certain level of functionality. When migrating from an on-premises software product to a SaaS solution, the functionality that existed in the on-premises software needs to exist in the SaaS solution:

***"And don't provide a new version that has less functionality than your old version. It just doesn't make sense"***

The multiple client versions that exist of any one on-premises software product means that the functionality that each client enjoys needs to be replicated into a single SaaS solution. This means that, until full functionality exists, the client business organisation will not implement the provisioned SaaS solution:

***"And you have this huge functionality that we have, and to replicate that functionality because clients wanted you know if we were going to have an upgrade path, it would have to have the same functionality"***

A key aspect of the IT strategy of the client is consideration regarding security and latency. Security is a major concern for clients when evaluating a SaaS solution due to the sensitive nature of the data that investment managers work with:

***“That’s the foremost [reason] why people were really scared about taking your portfolio which is your IP and putting it onto the internet, because actually it was a misconception and I think that was really the first wave of people’s understanding cloud computing and maybe the main reason why they really held back”***

Latency is a particular concern in South Africa due to where South Africa is positioned in relation to the rest of the world.

***“I mean obviously an Internet based solution; the one weakness of Internet based solutions is if you can’t get the internet; it is not going to work and so you know in South Africa, you know, in the beginning had pretty weak IT”***

One investment manager related his experience of this:

***“one provider where, beautiful product, everyone loves it and we use it in the front office and off they went, implemented it, started getting some performance issues due to framing sizes of the packets that they were sending. Another vendor addressed the latency issue by actually implementing local proxies to prevent your latency issues”.***

#### **4.3.1.5. Category 5: Migration**

The data collected during this case study indicate that migration and change is the core concept that these four categories have in common. The common theme expressed by all data slices is that cloud computing brings about change. A change in how the CSP that is provisioning a cloud product business strategy as well as how the CSP utilises IT in how it supports the CSP’s business strategy. The decision to adopt a cloud product changes how a client business organisation uses IT in achieving their business strategy.

Additionally, migration is a category in its own right as many of the codes identified during the open coding process points to a process of change or migration. From the data collected and analysed everything concerned with cloud computing from a CSP’s perspective is in a state of migration.

The migration from an on-premises software product to a SaaS product can be disruptive to both the CSP and the client business organisation.

***"Converting to the Cloud is not a change in Technology; it is a transformation of Business and Culture."***

The migratory process is not a simple one for the CSP which finds itself having to transform their products from being various on-premises products to one of provisioning to a single product that can benefit from a multi-tenant architecture. As mentioned in the preceding sections, the CSP had to transform their business revenue strategy from one of earning licence fees to a pay per use model. The decision to stop supporting and developing their legacy on-premises products and investing all of their resources into the SaaS product was a major change in business strategy. It involved a change in how the product will operate to how the CSP maintains and sells the product. This process involves the CSP undergoing a major migration.

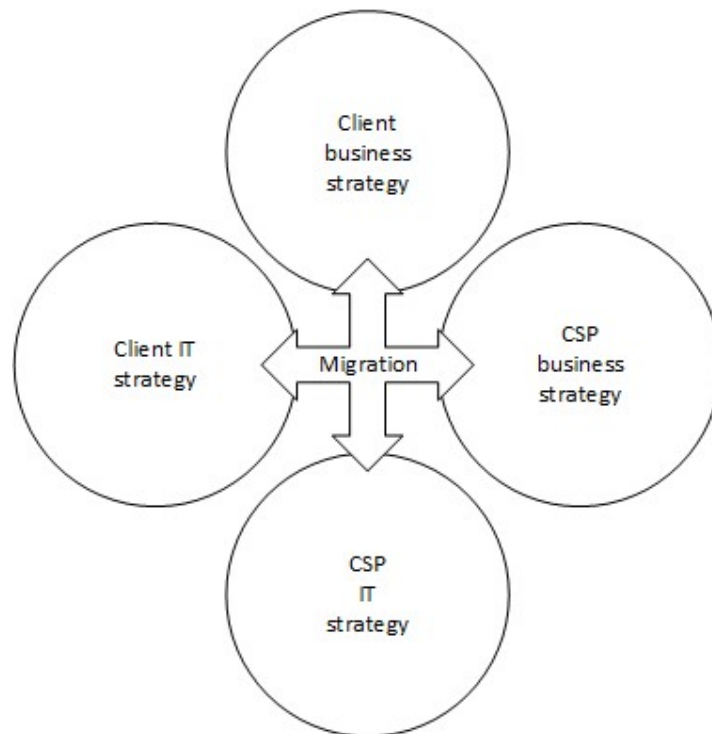
As mentioned under the previous section on client business strategy, cloud computing has the potential to revolutionise the investment management industry. Taking something that previously took 17 hours and now potentially takes an hour to complete has the potential to change the way in which an investment manager does their business. In this process the investment manager has to contend with changes to the type of software products that it will be utilising. Thus the effects that a SaaS solution can have on IT hardware and IT staff costs have to be considered by the investment manager. The investment manager adopting a SaaS solution has to adapt their business processes and business operations and in the process business policies regarding IT risk management and IT vendor contracting will need to be reviewed.

#### **4.3.2. Substantive coding – Selective coding**

During the selective coding phase, the core category is identified (Matavire & Brown, 2013). The core category explains the core challenge around which the emerging theory will be built (Adolph et al., 2012). The core category is the category that relates to all other categories and the one that is central to this research study (Matavire & Brown, 2013).

The core category identified as being central to this research study from the coding process is the category that is concerned with moving from one state to another. The

term selected in this study on the basis of the coding process for this phenomena category is 'migration'. Migration in the context of this study is the “golden thread” that connected the various categories to each other. What made this particular code stand out as the core category was that 'Migration' was a category in its own right, with various codes being grouped under this heading. Secondly, 'Migration' occurred in every category identified. Each of the categories undergoes a form or transformation as it moved from one state to another. Figure 4 below graphically represents migration as the core category around which each category is grouped as well as each category undergoing a form of migration.



*Figure 4; Migration as the core concept*

#### **4.3.3. Theoretical coding**

During the substantive coding phase the data are divided into incidents, then codes, and finally categories. These incidents, codes, and categories are analysed until a core category and its related categories emerge and are identified. Throughout the selective coding phase the data undergo constant comparison to identify properties of each category and code. This continues until theoretical saturation occurs (Holton, 2010). Theoretical saturation is reached when nothing new can be added to the



research study from additional sampling and analysis (Tan, 2010). Once theoretical saturation has been reached, theoretical coding takes place.

Theoretical codes model the relationship between substantive concepts (Glaser & Holton, 2005). Potential theoretical codes are evaluated to determine whether the theoretical code can integrate the core and related categories to produce hypotheses that can explain the observed experience (Holton, 2010). Codes identified during the substantive coding phase, substantive codes, are merely the properties and categories of a theory that emerges as part of a grounded theory study. These substantive codes are used in developing – or generating - the conceptual theory (Glaser & Holton, 2005).

The theoretical code “conceptualises how the substantive codes may relate to each other hypotheses to be integrated into the theory” (Glaser & Holton, 2005, p. 13). Between 1978 and 2005, Glaser identified multiple theoretical codes and coding families that can emerge in performing grounded theory studies: he identified 18 coding families and followed this up with an additional 9 in 1998, and lastly added 23 in 2005 (Hernandez, 2009). These coding families include The Six C’s, Process, Degree, Dimension, Type, Models, Scales and Balancing (Hernandez, 2009; Hoda et al., 2012).

Although not familiar with all of the theoretical codes and coding families as identified and suggested by Glaser, the two theoretical codes which the researcher considered best described how the categories relate to each other were type family theoretical code and balancing theoretical code. The core category identified during this research study was ‘migration’. As already explained, migration existed as both a category and a concept within each related category. For this reason migration could be explained using a type family theoretical coding. A type family theoretical code organises the core category and related category into a typology which presents the categories and discusses the key attributes of each, and how they relate to each other. A further theoretical code evaluated was the Balancing Theoretical Code. According to Glaser (2005), balancing was the “handling [of] many variables at once in order to start an action, keep an action going or achieve a resolution. One gets an equilibrium between all the variables” (p29). In the case of this study, balancing migration in the CSP business strategy, in the CSP IT strategy, in the client business strategy, in the client

IT strategy would allow the CSP to overcome its main concern which is migration. This would suggest that, only once these variables are in equilibrium can a CSP successfully provision its SaaS product to an investment management client for core business activities. Thus this theoretical code seemed to fit the substantive codes and the relationship that existed between them. While numerous theoretical codes can emerge from any GT research study, the theoretical code that best describes the relationship between the categories is the correct – or most useful - one. The theoretical code selected is the theoretical code that best fits the data (Hernandez, 2009). The balancing theoretical code best fits the relationship between the core category and the related categories. The theory of “Balancing Migration” as graphically represented in Figure 5 shows that in order to address the core challenge of migration each category needs to be in equilibrium. When equilibrium exists between the business strategy of the CSP and the client business organisation, as well as between the IT strategy of the CSP and the client business organisation, a CSP can, according to this theory, then overcome the core challenge to provisioning a SaaS product for a core business activity to the investment management industry. Chapter 5 will provide a theoretical discussion of the theory of “Balancing Migration”.

## Chapter 5: The core challenge of Migration

This chapter initially discusses the core challenge of migration as experienced by a CSP. This is followed by a description of the theory “Balancing Migration”. This theory describes how this theory relates to the core concept of migration and the related categories by discussing the theory by means of a storyline. By presenting the theory of “Balancing Migration” in the form of a storyline, the various codes which were identified from the data are combined together to form and organised whole theory (Hernandez, 2009). Utilising a story line as well as underlining all of the identified codes in the story line was performed by Adolph et al. (2013) to present his grounded theory entitled “Reconciling perspectives”.

This discussion is followed by reviewing literature published on migration, and specifically migration from legacy applications to new applications, including the migration to cloud computing. The subsequent section compares existing literature on migration to the theory of “Balancing Migration”. The objective of the discussion, literature review, and comparison is to determine whether the theory of “Balancing Migration” describes and addresses the core challenge faced by CSPs and whether the theory of “Balancing Migration” can contribute to theory.

The chapter concludes by explaining why the researcher considers the proposed theory of “Balancing Migration” is better suited to describe how the core challenge of “migration” experienced and overcome by the CSP instead of other theories expounded in existing migration literature.

### 5.1. Introduction

Migration was identified as the core challenge to provisioning SaaS solutions for an investment manager’s core business activity. The theory of “Balancing Migration” describes how a CSP overcomes this core concern.

The analysis of the data from the case study identified “migration” as the core challenge experienced by CSPs provisioning a SaaS product for core business activities in the investment management industry and showed that the theory of “Balancing Migration” is used to address this challenge. This case study on a CSP of migrating from offering on-premises software products for core business activities in

the investment management industry to offering SaaS solutions for core business activities in the investment management industry. Although the change from provisioning one type of product to provisioning a different type of product may seem a simple change in product offering, it actually has a significant impact on the way the CSP does its business and offers its products. The theory of “Balancing Migration” takes into consideration the effect that this migration has on the business strategy and on the IT strategy of the CSP. The migration from an on-premises product to a cloud based solution has a concrete and practical impact on the clients of a CSP, and the theory of “Balancing Migration” considers the impact on the client business organisation when the CSP decides to migrate from on-premises software to a SaaS solutions.

## **5.2. Theoretical discussion of “Balancing Migration”**

The theory of Balancing Migration posits that when a CSP decides to provision a SaaS solution for core business activities, this decision for the CSP, is a strategic one.

The CSP strategy needs to be reviewed so as to align with the decision made. The client profile of the CSP will change as the CSP is now able to provision their solution to smaller size clients that may have been previously sensitive to the cost of the product. For a CSP that has a history of being a traditional software vendor that previously provisioned on-premises software and is now migrating to being a CSP requires a cultural change to occur within the CSP.

To ensure that employees have accepted the change in the business strategy the perceptions of employees needs to be considered and managed. When provisioning a new solution the expertise of staff needs to be evaluated to ensure that employees possess the required skills to provision the new solution. Expertise of software developers who will be responsible for developing the solution as well as expertise of sales people who are responsible for selling the solution to clients need to be assessed.

The revenue model of the CSP that previously depended upon software licence fees as the source of income is now replaced by a revenue stream that is based upon a pay per use revenue model. This has a direct effect on the profitability of the CSP, especially if the costs of provisioning the cloud solution are lower than an on-premises

software solution. The change or migration that takes place within the CSP needs to be managed to ensure that the CSP can provision their SaaS solution.

The CSP IT strategy shapes the CSP's IT environment and the products that the CSP provision. New SaaS solutions or migrating existing on-premises software to the cloud requires a change in the IT strategy of the CSP. The product architecture, development approach, the technology stack and the IT infrastructure and environment that the CSP utilises needs to be adapted to allow the CSP to provision the new solution. Software developers are able to utilise new technologies and instead of having to purchase development environments, CSPs are able to create virtual development environments when developing SaaS solutions.

When developing and provisioning a cloud based solution connectivity and security are two key considerations. The manner in which product upgrades and releases are managed as well as the maintenance costs for a SaaS based solution is very different to that of an on-premise software solution. Due to client specific functionality or what is referred to as client “intellectual property” there could exist multiple versions of the same on-premises software solution for every client; and depending on the client profile of the CSP this could result in a very large amount of versions that need to be maintained and supported by the CSP. Ensuring that every product release or upgrade takes into consideration the different versions of the software in the market is an expensive matter. For a CSP migrating its on-premises software with a SaaS solution allows it to benefit from multitenancy and allows it to reduce the costs for CSP because only one version of the code needs to be maintained and supported.

Only after the CSP has been able to migrate both its business strategy as well as its IT strategy and find that these two categories are in equilibrium, can the CSP develop the SaaS product as well as ensure that the business is able to provision and support the new product.

Provisioning a SaaS solution for a core business activity requires that the client business strategy allows for the usage of a cloud-based solution for a core business activity. As the literature reviewed in this dissertation has shown, a business organisation is characterised by its core business activities and that core business activities are being directly linked to the profitability and longevity of a business organisation (Alm & Lowe, 2003; Boguslauskas & Kvedaraviciene, 2015). Due to their

importance to a business organisation core business activities are entrenched within a business organisation and various processes have been built around these core business activities. Provisioning a solution for a core business activity in environments where historically core business activities have been done using on-premise software can be difficult if the client business strategy does not permit for the outsourcing or the use of outsourced IT solutions for core business activities. The client business strategy needs to be migrated to a strategy where the client business organisation is not concerned where a software solution is installed rather the areas of concern should be functionality, benefits and the cost of the solution.

Concerns regarding security, data jurisdiction and the control of data in a SaaS solution needs to be addressed together with other client perceptions of SaaS solutions. Misconceptions and concerns have an impact on user resistance to cloud computing in the client business organisation. A cultural change within the client business organisation is required for a CSP to provision a SaaS solution for a core business activity.

The client IT strategy needs to be migrated to ensure that the client business organisation is able to utilise the SaaS solution being provisioned. User resistance amongst IT professionals tend to manifest if there are any misconceptions regarding job security. Utilising a SaaS solution removes the need to incur large IT hardware costs to operate software that can lower the IT costs. Other benefits to IT departments is that a SaaS solution benefit from elasticity and self-service which results in a SaaS solution being able to improve its performance as and when the business organisation requires. In addition, the risk of hardware failure that exists with on-premises software solutions is mitigated by the high availability offered by most CSPs. The benefits for the software developers of the CSP provisioning the SaaS solution is similar to the benefits for IT professionals at a client business organisation that adopts a SaaS solution by exposing them to the newest technologies and allows for IT professionals to improve their expertise.

Migration is the core challenge to CSPs provisioning a SaaS solution for core business activities. The provisioning of a new SaaS solution by a CSP who traditionally provisioned on-premises software or for an established CSP is challenged by migration. The amount of migration required might differ depending on the profile of

the CSP, but the business strategy and the IT strategy of the CSP will undergo migration. Attempting to provision a product while these categories are migrating can prove difficult for the CSP. Stabilising, and finding equilibrium in its business strategy will allow the CSP as a business to provide sustainable support to the provisioning of the SaaS solution. Finding equilibrium in its IT strategy allows the CSP to develop and deploy a SaaS solution that can offer all of the benefits of a cloud based solution to both the CSP and the client business organisation. Provisioning a SaaS solution for core business activities requires that clients are adopting the solution and using it in core business activities.

A client business organisation that utilises a SaaS solution for a core business activity requires its business strategy and its IT strategy to be aligned. The client IT strategy cannot employ a SaaS solution for core business activity if the business strategy of the client business organisation prohibits it. Likewise a client business organisation that wishes to use SaaS solutions for core business activities requires that its IT strategy and IT department are supportive of using SaaS solutions for core business activities. Changing the process around a core business activity or the software solution that is used will have an effect on the business. The change can lead to the business organisation experiencing difficulty. Migrating the business strategy to address any difficulties and to allow the client business organisation to profit from the benefits of utilising a SaaS solution for a core business activity is required. The migration of the client IT strategy is important because the SaaS solution is IT based and the effect that a SaaS solution can have an impact on the architecture, IT infrastructure and environment, IT product stack and IT staff.

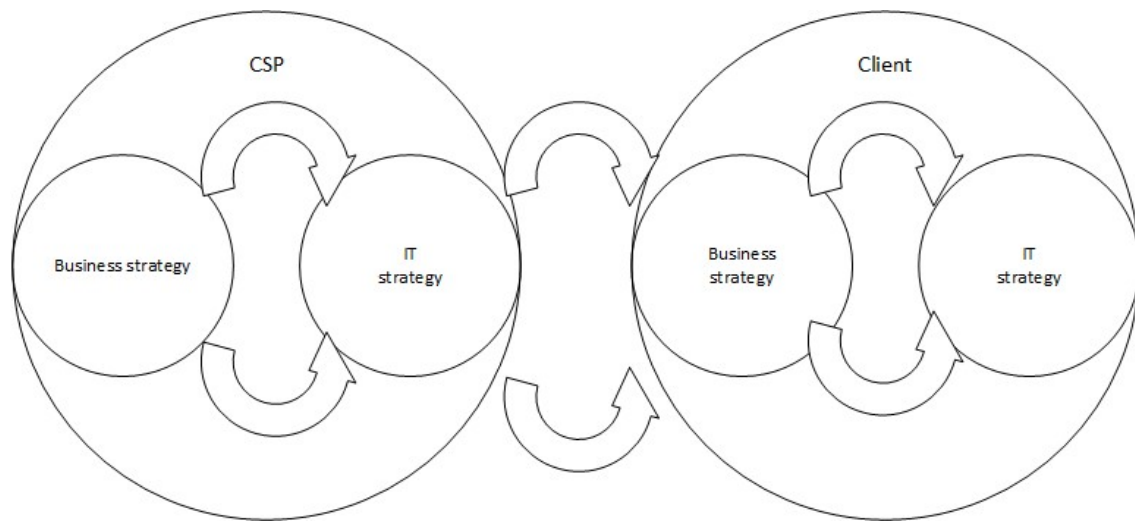


Figure 5: Balancing Migration

Figure 5 presents the theory of Balancing Migration graphically. This dissertation states multiple times that the core challenge to a CSP provisioning a SaaS solution for a core business activity is migration. This challenge exists in both the domain of the CSP as well as in the domain of the client organisation. The client organisation as well as the CSP experience migration in their business and IT strategy. The kinds of migration include migration of the business strategy to provision a SaaS solution, and the business strategy to utilise a SaaS solution for a core business activity for the CSP and client business organisation respectively. Then there is also the migration of the IT strategy of the CSP to provision a new solution and migration of the IT strategy of the client business organisation that will be using the new IT solution. The theory of balancing migration addresses this core concern by suggesting that in both domains mentioned the migration of business strategy and migration of IT strategy needs to be managed and balanced.

### 5.3. Migration literature review

A review of various papers and articles on both legacy system migration and cloud migration was done to identify theories published on migration. The term “cloud migration” and “legacy system migration” was used to search criteria on Google Scholar as well on the ACM digital library. In total, thirteen cloud migration articles



were selected for review. Only papers published after 2010, and those papers making specific reference to cloud computing, were reviewed. The papers reviewed were first grouped into two categories based on the perspective of the paper. These categories were based on the perspective taken in each of the papers reviewed. Either they discussed migration from legacy systems to cloud computing from the perspective of a business organisation, or end user of IT wanting to migrate to a cloud based technology solution. These papers were classified as having a client perspective. Similarly, papers that discuss software vendors or IT departments within organisations wanting to migrate their technology and solutions to a cloud based technology solution were categorised as having a CSP perspective. Because the proposed theory of “Balancing Migration” has the same two perspectives of client and CSP, this categorisation was used to ensure that comparisons could be made between the theory proposed and those in the literature. Secondly, each paper was evaluated and categorised based on the focus area that each paper attempted to address. The focus areas identified in the literature were based on examining the keywords as well as analysing each paper reviewed. The papers reviewed either focused on the migration decision or the migration process. The cloud migration literature categories identified, and the number of papers in each category, are depicted in Table 5.

<b>Perspective</b>	<b>Focus</b>	<b>Number of papers</b>
<b>Client</b>	Migration decision	5
<b>Client</b>	Migration process	4
<b>CSP</b>	Migration process	4

*Table 5: Cloud migration literature categories*

### **5.3.1. Literature on client migration decision**

The first category of papers reviewed discussed the cloud migration decision from the perspective of the client business organisation. The earliest paper reviewed within this category was a cloud strategy document published by the White House in the United States of America in February 2011. The strategy document provides a decision framework for cloud migration to be used by the United States government entities who at the time wished to migrate to cloud computing technology (Kundra, 2011). The other papers reviewed provide a decision process model, a decision framework, and a process model for decision support systems to assist clients wanting

to migrate to cloud computing solutions (Alkhalil, Sahandi, & John, 2016; Beserra, Camara, Ximenes, Albuquerque, & Mendonça, 2012; Dhiman, 2011; Islam, Weippl, & Krombholz, 2014). The models and frameworks proposed are to assist business organisations and end users (clients) in identifying the risks and requirements of cloud migration (Beserra, Camara, Ximenes, Albuquerque, & Mendonça, 2012; Islam, Weippl, & Krombholz, 2014). The paper by Dhiman (2011) was initially categorised as focusing on the cloud migration process as it reviewed cloud migration strategies employed by business organisations proposed a framework for cloud migration decisions, which, based on the definition provided earlier, categorised this as a “client migration decision” paper (Dhiman, 2011).

### **5.3.2. Literature on client migration process**

The second category identified during the review of cloud migration literature is that of client migration process. Four of the thirteen papers reviewed were categorised as “client migration process” papers. These papers proposed a migration process framework, a cloud readiness process model, a cloud adoption assessment model, and a model combining technology change models readiness with the expectation confirmation model (Jermyn, Hwang, Bai, Anerousis, & Stolfo, 2014; Nasir & Niazi, 2011; Ong & Lin, 2013; Pahl, Xiong, & Walshe, 2013). Ong and Lin (2013) identified issues with cloud migration stemming from user acceptance and user resistance to new technology, and proposed a model that explained the need to ensure the satisfaction of users with any technology implementation including a migration to a cloud based solution.

### **5.3.3. Literature on CSP migration process**

The final category identified from the papers reviewed is CSP migration process. This category explores cloud migration from the perspective of either a software vendor or an IT or software development department within a business organisation wanting to migrate from an on-premises legacy system to a cloud based system. A cloud migration process model or framework was proposed by two of the papers reviewed. The model or framework proposed by these authors attempts to address the challenges of migrating legacy systems to the cloud from a software architecture and software engineering perspective (Ahmad & Babar, 2014; Gholami, Daneshgar,

Beydoun, & Rabhi, 2017). Babar and Chauhan (2011) do not propose any theories but provide an overview of experiences and observations of vendors and developers migrating to cloud computing. A review of existing cloud migration approaches is provided by the final paper reviewed published by Gholami, Daneshgar, Low, & Beydoun (2016). This paper evaluates the different cloud migration processes and strategies by using a proposed evaluation framework. Table 6 provides a list of all the papers reviewed.

<b>Title</b>	<b>Migration category</b>	<b>Citation</b>
<b>Federal cloud computing strategy</b>	Client migration decision	(Kundra, 2011)
<b>Analysis of on-premises to cloud computing migration strategies for enterprises</b>	Client migration decision	(Dhiman, 2011)
<b>Cloudstep: A step-by-step decision process to support legacy application migration to the cloud</b>	Client migration decision	(Beserra, Camara, Ximenes, Albuquerque, & Mendonça, 2012)
<b>A decision framework model for migration into cloud business, application, security and privacy perspectives</b>	Client migration decision	(Islam, Weippl, & Krombholz, 2014)
<b>A review of the current level of support to aid decisions for migrating to cloud computing</b>	Client migration decision	(Alkhalil, Sahandi, & John, 2016)
<b>Cloud computing adoption assessment model (CAAM)</b>	Client migration process	(Nasir & Niazi, 2011)
<b>A comparison of on-premises to cloud migration approaches</b>	Client migration process	(Pahl, Xiong, & Walshe, 2013).
<b>The impacts of user readiness on perceived value</b>	Client migration process	(Ong & Lin, 2013)
<b>Improving readiness for enterprise migration to the cloud</b>	Client migration process	(Jermyn, Hwang, Bai, Anerousis, & Stolfo, 2014)

<b>Title</b>	<b>Migration category</b>	<b>Citation</b>
<b>A tale of migration to cloud computing for sharing experiences and observations</b>	CSP migration process	(Babar & Chauhan, 2011)
<b>A framework for architecture-driven migration of legacy systems to cloud-enabled software</b>	CSP migration process	(Ahmad & Babar, 2014)
<b>Key challenges during legacy software system migration</b>	CSP migration process	(Gholami, Daneshgar, Beydoun, & Rabhi, 2017)
<b>Cloud migration process—a survey, evaluation framework, and open challenges</b>	CSP migration process	(Gholami, Daneshgar, Low, & Beydoun, 2016)

*Table 6: Summary of migration literature reviewed*

## **5.4. “Balancing Migration” vs cloud migration literature**

### **5.4.1. “Balancing Migration”**

As discussed in Section 5.2.1., the theory of “Balancing Migration” proposes migration as the core challenge experienced by CSPs provisioning a SaaS product for core business activities in the investment management industry. To address the challenge the CSP needs to find equilibrium across all four categories being affected. In the case of this CSP case study, “Finding a balance” between the CSP migrating from being an on-premises software only vendor to becoming a CSP, is a key area to balance. The CSP needs to take into account the context of the changing business strategy and the changing IT products being provisioned in order for the CSP to overcome its core challenge. While the data collected for the current study pointed to the South African investment management industry “opening up” to cloud computing solutions, South African investment managers continue to have legacy systems and legacy business strategies that need to migrate before they can fully embrace SaaS solutions in their core business activities. Although the investment manager’s business and IT product strategies are not under the control of the CSP, in the case of this study, the CSP was able to provide demonstrations and workshops to educate their clients about the benefits of cloud computing and their SaaS solution. Balancing Migration as a theory helps to resolve the core challenge of migration and points to the need to balance migration across all four categories. If any of these categories are not in equilibrium the provisioning of a SaaS product will be challenged and at risk. For example, if a CSP has not aligned its business strategy to fully support provisioning a SaaS solution, or if a client business organisation is not able to change their business processes or IT systems to integrate with the SaaS solution, then the CSP will not be able to provision their solution.

### **5.4.2. Cloud migration literature**

The papers reviewed address cloud migration from either the perspective of the CSP or from that of the client. The client perspective papers discuss CSPs but the focus of these papers is on addressing challenges experienced by the client organisation wanting to migrate to the cloud. The decision frameworks proposed by these papers include discussions on the need and the value of evaluating the CSPs, and on

identifying the potential risks and benefits of a particular CSP. The authors advocate the inclusion of the risks and benefits in the decision making process (Islam, Weippl, & Krombholz, 2014). These papers also discuss vendor lock-in, vendor support, vendor capability, vendor staff, vendor SLAs and vendor compliance as areas that client organisations need to take into account during the cloud migration process (Kundra, 2011; Nasir & Niazi, 2011; Pahl, Xiong, & Walshe, 2013).

Papers that address cloud migration from the CSP perspective focus on the migration of systems to the cloud, on the technical migration of systems from an architectural and system engineering perspective. Many of the reviewed papers discuss Service Orientated Architecture (SOA) migration as being similar to cloud migration (Ahmad & Babar, 2014; Babar & Chauhan 2011; Gholami, Daneshgar, Low, & Beydoun, 2016; Gholami, Daneshgar, Beydoun, & Rabhi, 2017). One reason for this could be the fact that both SOA and SaaS have services as their core characteristic (Gholami, Daneshgar, Low, & Beydoun, 2016).

The literature review of cloud migration performed as part of this study was not a thorough or comprehensive review of all the literature that exists on cloud migration. As has been mentioned, the papers reviewed were only those published since 2010. Papers dealing specifically with SOA migration were also excluded so as to allow a clear space for comparison between cloud migration theories. Jamshidi, Ahmad, & Pahl (2013) provide a review of a body of literature consisting of twenty three cloud migration literature published between 2010 and 2013. The aim of their paper was to taxonomically classify and compare existing research on cloud migration published during that period. According to classification model of these authors, the proposed Cloud Reference Migration Model (Cloud-RMM) classified extant literature into one of three categories: migration planning, migration execution, and migration evaluation (Jamshidi, Ahmad, & Pahl, 2013). When comparing, the perspective of the twenty three cloud migration papers to the literature review performed as part of this study, the researcher found that the former papers were all from the CSP perspective. The twenty three papers reviewed by Jamshidi, Ahmad, and Pahl (2013), together with the 13 papers reviewed by the researcher for this study, makes the coverage of papers published since 2010 for a literature review on cloud migration significant and comprehensive.

### **5.4.3. Why “Balancing Migration” ?**

The proposed theory of “Balancing Migration” is an all-inclusive theory for addressing the core challenge to CSPs in provisioning SaaS solution for core business activities: migration of the CSP and migration of the client environments. The various papers reviewed only attempt to address migration challenges experienced by client business organisations or by CSPs. The researcher would argue that, from all the theories proposed by the literature reviewed that address the migration challenge faced by client business organisations, none of them are applicable in any useful or satisfactory way to the CSP. Similarly the theories proposed in the literature reviewed to address challenges faced by CSPs have not been applied to client business organisations. Thus the proposed theory of “Balancing Migration” addresses the various migration challenges experienced simultaneously by the CSP and the client business organisation by, firstly identifying the migration challenge that exists, and once identified, the “Balancing Migration” theory proposes that an equilibrium needs to be found in all four categories to address this migration challenge experienced by a CSP provisioning a SaaS solution for core business activities.

Balancing migration does not propose specific theories to address the specific migration challenges that exist in each discrete category, although it is clear that there exists enough literature on solving the migration challenge within each discrete category. The proposed theory of “Balancing Migration”, rather than advancing any specific cloud migration theory as a solution to each specific cloud migration category and challenge, instead advocates the need to combine client migration theory and CSP migration theory, in equilibrium or balance, to ensure that all the migration challenges are addressed.



## Chapter 6: Conclusion

### 6.1. Introduction

The main objective of this research is to identify the main concern that CSPs face in provisioning SaaS solutions for core business activities for the South African investment management industry, and to establish how it is resolved.

Although Glaser (2002) argues that grounded theory research should be conducted without preconceptions, the reality is that it is impossible for a researcher performing research in their area of interest to avoid having preconceived ideas (Matavire & Brown, 2013). In the case of this study, the preconceived idea or belief was that the core challenges faced by the CSP in trying to provision their SaaS product for core business activities was security, together with outsourcing theory. While concerns around security do exist and the data collected in fact showed security to be a challenge due to the nature of the data that an investment manager uses everyday as part of the business activities. Furthermore, by applying outsourcing theory to cloud computing, that if a business activity is classified as being core meant that a cloud based solution would never be used. Authors of IT outsourcing and core business activity literature reviewed and discussed in this dissertation were all of the view that no core business activity should ever be outsourced (Hätönen & Eriksson, 2009; Yang et al, 2007; Harland et al., 2005; Yang & Huang, 2000; Prahalad & Hamel, 1990).

The CGT approach was used during the course of this study to identify a core challenge that emerged from the data collected proved invaluable. The views, and the challenges experienced by the participants in the study, were shared with the researcher, and analysed to identify the core challenge that emerged from the data.

Migration emerged from the data as the core challenge to a CSP provisioning a SaaS solution for core business activities in the investment management industry and the theory of “Balancing Migration” emerged as the theory to address the core challenge. The theory of “Balancing Migration” focuses on the core category of migration, and the relationship that exists between the core category and other categories. Applying the theoretical codes and coding families proposed by Glaser during the theoretical coding phase, specifically the balancing theoretical code which, according to Glaser (2005), involved “handling many variables at once in order to start an action, keep an action

going or achieve a resolution. One gets an equilibrium between all the variables” (p.29) (as cited by Hoda et al., 2012). Thus, according to this concept, in order to resolve the challenge of migration, experienced as the core challenge in provisioning SaaS solutions for core business activities for the South African investment management industry, a CSP needs to balance the many variables at once: a CSP needs to “Balance Migration”.

The CSP, the client, the product being provisioned, and everything else that is related to these are migrating. The provisioning of software does not happen in isolation and the data collected indicates this. The CSP, together with the processes and strategy of the CSP, are all affected. The client purchasing the software being provisioned does not purchase it in a vacuum. The knowledge, expertise, and views of multiple respondents indicated that the purchase of a software solution by a business organisation can be a complex and risky exercise. A business organisation purchasing software needs to ensure that the correct infrastructure is in place, and that the business has staff to operate the new software and to look after and monitor the infrastructure. The staff operating and maintaining the entire system needs to be adequately trained and motivated to use the system. While the benefits of SaaS solutions to business, as expounded by the literature, are clear, this change in how a business organisation utilises IT can be a tricky process. In the case where a SaaS solution is to replace an existing on-premises solution the process involves multiple changes: to the business organisation’s operating model, to expenditure, to policies, and changes to business processes.

None of the four categories mentioned by the theory of “Balancing Migration” experiences the migration in isolation; all four categories (CSP business strategy, CSP IT strategy, Client business strategy and Client IT strategy) are experiencing migration. The theory of “Balancing Migration” posits that finding equilibrium across these categories is key to a CSP addressing its core challenge. If the CSP’s business strategy is in imbalance or its IT strategy is not positioned to support provisioning a SaaS solution, it will not be able to provision its SaaS solutions effectively. A client business organisation not being fully prepared in terms of its business strategy and IT strategy to adopt and embrace a cloud solution proves a challenge to a CSP wanting to provision its SaaS solution. To address the core challenge of migration for a CSP provisioning a SaaS solution for core business activities, a CSP needs to balance the

migration of its business strategy in conjunction with the migration of its IT strategy together with balancing of the migration of the business strategy as well as the IT strategy of the client business organisation.

## **6.2. Limitations of the study**

The problem statement made in Chapter 1 that, “*Business organisations within the financial industry that have adopted cloud solutions have mainly adopted products that are not used in the core business activities of that business organisation*” and the motivation to understand why this is the case is the reason for the major limitation of this research study. Specifically in the investment management sector within the financial services industry currently only one CSP provisions SaaS solutions for core business activities in South Africa. The CSP in question is in the process of migrating their legacy on-premises software products to a SaaS solution, and the core challenge experienced in this process may not be the case with established CSPs. The aim of this case study was to be able to generalise the findings across other CSPs. The biggest limitation that this research potentially possessed was that the findings could not be categorically or verifiably generalised for all CSPs. Given the rapid advancements in technology and the changing nature of business, that the business environment for CSPs provisioning cloud computing solutions for core business activities is never stable and is frequently undergoing migration or change. As technology changes the CSP needs to manage the changes or migration that occurs, together with the almost constant changes to business the core business activities of a client business organisation will also undergo some form of migration. Thus migration, it could be argued, is a concern to both newly established CSPs as well as to experienced CSPs and the need to balance migration is important in overcoming this challenge.

A further limitation of this study is the focus on the South African investment management industry. Research conducted by Akande and Van Belle (2014) and by Howell-Barber et al. (2013) found that the financial services sector has been reluctant to adopt SaaS for core business activities. Specifically the research performed by Akande & Van Belle (2014) stated that the financial services industry in South Africa has had very low levels of cloud computing adoption for core business activities and

focusing on this industry allowed this research study to understand why the adoption of cloud computing for core business activities were identified as being low.

Both of these limitations can be addressed by further research studies; this is discussed in the next section.

### **6.3. Research contribution and future research**

Section 5.4.3 details the motivation why the theory of “Balancing Migration” is the better fit than other existing theories for resolving the core challenge to CSP provisioning as shown by the findings of this study. It is clear from the cloud migration literature reviewed and discussed that cloud migration is topical and that numerous theories have been and are being proposed in the literature in order to address the migration challenges experienced by CSPs and client organisations. The decision to choose the proposed theory of “Balancing Migration” over existing theories was influenced by, and based on, the context of this study.

This study identified migration as the core challenge to CSP provisioning SaaS solutions for core business activities. Existing theories provide potential – or partial - solutions to address cloud migration challenges experienced either by client organisations or by CSPs. To address the core challenge to CSP provisioning SaaS solutions for core business activities requires the migration challenges experienced by both the CSP and the client to be addressed simultaneously and as a whole. Theories that address both the CSP and the client simultaneously were not discovered during the literature review phase. The contribution that the theory of “Balancing Migration” is proposing to cloud migration theory is the idea that resolving the core challenge of migration as experienced by CSPs provisioning SaaS solutions for core business activities requires that both CSP migration challenges and client migration challenges need to be addressed concurrently. It is clear from the literature reviewed that this is where there is a gap in cloud migration theory. The proposed theory of “Balancing Migration” identifies this as a theoretical gap that needs to be addressed. Thus, it is hoped that the theory of “Balancing Migration” will encourage other cloud migration theorists to begin to consider theory that addresses this gap and that theory will begin to emerge that considers both the client and the CSP together, as an entity, in any attempt to address migration challenges experienced by both parties.

As mentioned in the previous section, the case study employed was specifically on the South African investment management industry. The possibility exists that performing a similar case study on a CSP provisioning a cloud computing solution for core business activities in a different country, or in a different economic sector or industry, may provide a different viewpoint.

The theory of “Balancing Migration” is based on a case study performed on a single CSP which is in the process of migrating from being an on-premises software vendor to becoming a CSP. Further case studies on other CSPs, specifically case studies on established CSPs migrating legacy on-premises software to complement their existing SaaS software would provide a different and/or additional perspective and provide an opportunity to test the theory of “Balancing Migration”.

#### **6.4. Summary**

The research performed has identified “migration” as the main concern for a CSP provisioning a SaaS solution for a core business activity, and the theory of “Balancing Migration” is how this core concern is resolved.

## References

- Adolph, S. (2013). *Reconciling Perspectives: a substantive theory of how people manage the process of software development (Unpublished doctoral dissertation)*. Vancouver, Canada: The University of British Columbia.
- Adolph, S., Hall, W., & Kruchten, P. (2008). A methodological leg to stand on: lessons learned using grounded theory to study software development. *Proceedings of the 2008 conference of the center for advanced studies on collaborative research: meeting of minds* (p. 13). New York, United States of America: ACM.
- Adolph, S., Kruchten, P., & Hall, W. (2012). Reconciling perspectives: A grounded theory of how people manage the process of software development. *Journal of Systems and Software*, 85(6), 1269-1286.
- Ahmad, A., & Babar, M. A. (2014). A framework for architecture-driven migration of legacy systems to cloud-enabled software. *Proceedings of the WICSA 2014 Companion Volume* (pp. 7-15). Sydney, Australia: ACM.
- Akande, A. O., & Van Belle, J. P. (2014). A proposed framework to assess and increase the cloud computing readiness of financial institutions in South Africa. *In Confluence The Next Generation Information Technology Summit (Confluence) 2014 5th International Conference* (pp. 46-52). Noida, India: IEEE.
- Aleem, A., & Sprott, C. R. (2012). Let me in the cloud: analysis of the benefit and risk assessment of cloud platform. *Journal of Financial Crime*, 20(1), 6-24.
- Alexander, M., & Young, D. (1996). Strategic outsourcing. *Long range planning*, 29(1), 116-119.
- Alkhalil, A., Sahandi, R., & John, D. (2016). A Review of the Current Level of Support to Aid Decisions for Migrating to Cloud Computing. *Proceedings of the International Conference on Internet of things and Cloud Computing* (pp. 58-66). Cambridge, United Kingdom: ACM.
- Alm, A., & Lowe, G. F. (2003). Outsourcing core competencies? In G. L. Hujanen, *Broadcasting and convergence: new articulations of the public service remit* (pp. 223-235). Göteborg, Sweden: Nordicom.

- Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R. H., Konwinski, A., . . . Zaharia, M. (2010). Above the Clouds: A Berkeley View of Cloud Computing. *Communications of the ACM*, 53(4), 50-58.
- Babar, M. A., & Chauhan, M. A. (2011). A tale of migration to cloud computing for sharing experiences and observation. *Proceedings of the 2nd international workshop on software engineering for cloud computing* (pp. 50-56). Honolulu, United States of America: ACM.
- Barriball, K. L., & While, A. (1994). Collecting Data using a semi-structured interview: a discussion paper. *Journal of advanced nursing*, 19(2), 328-335.
- Belcourt, M. (2006). Outsourcing—The benefits and the risks. *Human resource management review*, 16(2), 269-279.
- Benlian, A., Hess, T., & Buxmann, P. (2009). Drivers of SaaS-adoption—an empirical study of different application types. *Business & Information Systems Engineering*, 1(5), 357-369.
- Beserra, P. V., Camara, A., Ximenes, R., Albuquerque, A. B., & Mendonça, A. C. (2012). Cloudstep: A step-by-step decision process to support legacy application migration to the cloud. *2012 IEEE 6th International Workshop on the Maintenance and Evolution of Service-Oriented and Cloud-Based Systems (MESOCA)* (pp. 7-16). Trento, Italy: IEEE.
- Bines, H. E. (1976). Modern Portfolio Theory and Investment Management Law: Refinement of Legal Doctrine. *Columbia Law Review*, 76(5), 721-798.
- Bines, H., & Thel, S. (2016). The varieties of investment management law. *Fordham Journal of Corporate & Financial Law*, 21(1), 71-162.
- Boguslauskas, V., & Kvedaraviciene, G. (2015). Difficulties in identifying Company's Core Competencies and Core Processes. *Engineering Economics*, 62(2), 75-81.
- Boulaksil, Y., & Fransoo, J. C. (2010). Implications of outsourcing on operations planning: findings from the pharmaceutical industry. *International Journal of Operations & Production Management*, 30(10), 1059-1079.

- Brentani, C. (2003). *Portfolio management in practice*. Burlington, United States of America: Elsevier Butterworth-Heinemann.
- Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., & Brandic, I. (2009). Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility. *Future Generation computer systems*, 25(6), 599-616.
- Celar, S., Seremet, M., & Turic, M. (2011). Cloud computing: definition, characteristics, services and models. *Annals of DAAAM for 2011 & Proceedings of the 22nd International DAAAM Symposium*. 22, pp. 1-2. Vienna, Austria: DAAAM International.
- Charmaz, K. (2008). Constructionism and the grounded theory method. In J. A. Holstein, & J. F. Gubrium, *Handbook of constructionist research* (pp. 397-412). New York, United States of America: The Guilford Press.
- Chen, D. Q., Mocker, M., Preston, D. S., & Teubner, A. (2010). Information systems strategy: reconceptualization, measurement, and implications. *MIS quarterly*, 34(2), 233-259.
- Chen, L., & Tan, J. (2001). Technology Adaptation in E-commerce:: Key Determinants of Virtual Stores Acceptance. *European Management Journal*, 22(1), 74-86.
- Cho, V., & Chan, A. (2013). An integrative framework of comparing SaaS adoption for core and non-core business operations: An empirical study on Hong Kong industries. *Information Systems Frontiers*, 1-16.
- Chraibi, M., Hamid, H., & Abdelilah, M. (2013). Classification of security issues and solutions in cloud environments. *Proceedings of International Conference on Information Integration and Web-based Applications & Services*. Vienna, Austria: ACM.
- Clark, R. C. (1981). The Four Stages of Capitalism: Reflections on Investment Management Treatises. *Harvard Law Review*, 94(3), 561-582.
- Cloud Security Alliance. (2011, November 14). *Security guidance for critical areas of focus in cloud computing*. Retrieved April 16, 2015, from Cloud Security Alliance: <https://cloudsecurityalliance.org/research/security-guidance/>



- Cohen, J. F., Mou, J., & Trope, J. (2014). Adoption of Cloud Computing by South African Firms: The Role of Institutional Forces, Absorptive Capacity, and Top Management. *In Proceedings of the Southern African Institute for Computer Scientist and Information Technologists Annual Conference 2014 on SAICSIT 2014 Empowered by Technology* (pp. 30-37). Centurion, South Africa: ACM.
- Cooney, A. (2010). Choosing between Glaser and Strauss: an example. *Nurse researcher*, 17(4), 18-28.
- Corbett, M. (2004). *The outsourcing revolution: Why it makes sense and how to do it right*. Dearborn Trade Publishing.
- Cullinan, C. P., & Xiaochuan, Z. (2015). Outsourcing accounting information systems: Evidence from closed-end mutual fund families. *International Journal of Accounting Information Systems*, 17, 65-83.
- Dhar, S. (2012). From outsourcing to Cloud computing: evolution of IT services. *Management Research Review*, 35(8), 664-675.
- Dhiman, A. (2011). *Analysis of on-premise to cloud computing migration strategies for enterprises*. Cambridge, United States of America: Massachusetts Institute Of Technology.
- Dibbern, J., Goles, T., Hirschheim, R., & Jayatilaka, B. (2004). Information systems outsourcing: a survey and analysis of the literature. *ACM SIGMIS Database*, 35(4), 6-102.
- Dillon, T., Wu, C., & Chang, E. (2010). Cloud computing: issues and challenges. *Proceedings of the 2010 24th IEEE Intl. Conference on Advanced Information Networking and Applications (AINA)* (pp. 27-33). Perth, Australia: IEEE.
- Dos Santos, B. L., & Peffers, K. (1998). Competitor and vendor influence on the adoption of innovative applications in electronic commerce. *Information & Management*, 34(3), 175-184.
- Evans, G. L. (2013). A novice researcher's first walk through the maze of grounded theory. *Grounded Theory Review*, 12(1), 37-55.

- Farber, D. (2008, September 26). *Oracle's Ellison nails cloud computing*. Retrieved 04 09, 2015, from CNET News: <http://www.cnet.com/news/oracles-ellison-nails-cloud-computing/>
- Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative inquiry*, 12(2), 219-245.
- Frambach, R. T., Barkema, H. G., Nooteboom, B., & Wedel, M. (1998). Adoption of a service innovation in the business market: An empirical test of supply-side variables. *Journal of Business Research*, 41(2), 161-174.
- Gangwar, H., Date, H., & Ramaswamy, R. (2015). Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. *Journal of Enterprise Information*, 28(1), 107-130.
- Gartner. (2011, October 31). *Gartner Says Cloud Banking Can Drive 'Creative Destruction' in the Banking Industry*. Retrieved 03 09, 2015, from Gartner Newsroom: <http://www.gartner.com/newsroom/id/1835114>
- Gerring, J. (2004). What is a case study and what is it good for? *American political science review*, 98(02), 341-354.
- Ghodeswar, B., & Vaidyanathan, J. (2008). Business process outsourcing: an approach to gain access to world-class capabilities. *Business process management journal*, 14(1), 23-38.
- Gholami, M. F., Daneshgar, F., Beydoun, G., & Rabhi, F. (2017). Key challenges during legacy software system migration to cloud computing platforms an empirical study. *Information Systems*, 67(1), 100-113.
- Gholami, M. F., Daneshgar, F., Low, G., & Beydoun, G. (2016). Cloud migration process—A survey, evaluation framework, and open challenges. *Journal of Systems and Software*, 120(1), 31-69.
- Giske, T., & Artinian, B. (2007). A personal experience of working with classical grounded theory: From beginner to experienced grounded theorist. *International Journal of Qualitative Methods*, 6(4), 67-80.
- Glaser, B. G. (1999). The future of grounded theory. *Qualitative health research*, 9(6), 836-846.

- Glaser, B. G. (2002). Conceptualization: On theory and theorizing using grounded theory. *International Journal of Qualitative Methods*, 1(2), 23-38.
- Glaser, B. G. (2005). *The grounded theorie perspective III: theoretical coding*. Mill Valley, United States of America: Sociology Press.
- Glaser, B. G. (2012). All is Data. In J. A. Holton, & B. G. Glaser, *The Grounded Theory Methodology Reader* (pp. 235-256). Mill Valley, United States of America: Sociology Press.
- Glaser, B. G. (2014). Choosing Grounded Theory. *The Grounded Theory Review*, 13(2), 3-19.
- Glaser, B. G., & Holton, J. (2005). Staying open: The use of theoretical codes in grounded theory. *The Grounded Theory Review*, 5(1), 1-20.
- Goede, R., & de Villiers, C. (2003). The applicability of grounded theory as research methodology in studies on the use of methodologies in IS practices. *In Proceedings of the 2003 annual research conference of the South African institute of computer scientists and information technologists on Enablement through technology* (pp. 208-217). Pretoria, South Africa: South African Institute for Computer Scientists and Information Technologists.
- Gong, C., Liu, J., Zhang, Q., Chen, H., & Gong, Z. (2010). The characteristics of cloud computing. *In 2010 39th International Conference on Parallel Processing Workshops (ICPPW)* (pp. 275-279). San Diego, United States of America: IEEE.
- Gonzalez, R., Gasco, J., & Llopis, J. (2005). Information systems outsourcing risks: a study of large firms. *Industrial Management & Data Systems*, 105(1), 45-62.
- Gottschalk, P., & Solli-Sæther, H. (2006). Maturity model for IT outsourcing relationships. *Industrial Management & Data Systems*, 106(2), 200-212.
- Grubisic, I. (2014). ERP in clouds or still below. *Journal of Systems and Information Technology*, 16(1), 62-76.
- Gupta, N., & Varshapriya, J. N. (2014). Software as a Service. *International Journal of Innovative Research in Advanced Engineering*, 1(6), 107-112.

- Gurbaxani, V. (2007). Information systems outsourcing contracts: Theory and evidence. In U. Apte, & U. Karmarkar, *Managing in the Information Economy* (pp. 83-115). Boston, United States of America: Springer US.
- Harland, C., Knight, L., Lamming, R., & Walker, H. (2005). Outsourcing: assessing the risks and benefits for organisations. *International Journal of Operations & Production Management*, 25(9), 831-850.
- Hätönen, J., & Eriksson, T. (2009). 30+ years of research and practice of outsourcing—Exploring the past and anticipating the future. *Journal of International Management*, 15(2), 142-155.
- Heikkilä, J., & Cordon, C. (2002). Outsourcing: a core or non-core strategic management decision? *Strategic change*, 11(4), 183-193.
- Hernandez, C. A. (2009). Theoretical Coding in Grounded Theory Methodology. *Grounded Theory Review*, 8(1), 51-60.
- Hoda, R., Noble, J., & Marshall, S. (2012). Developing a grounded theory to explain the practices of self-organizing Agile teams. *Empirical Software Engineering*, 17(6), 609-639.
- Holton, J. A. (2010). The Coding Process and Its Challenges. *The Grounded Theory Review: An international journal*, 9(1), 21 -40.
- Howell-Barber, H., Lawler, J. P., Desai, S., & Joseph, A. (2013). A Study of Cloud Computing Software as a Service (SaaS) in Financial Firms. *Journal of Information Systems Applied Research (JISAR)*, 6(3), 4-13.
- Hsu, P. F., Ray, S., & Li-Hsieh, Y. Y. (2014). Examining cloud computing adoption intention, pricing mechanism, and deployment model. *International Journal of Information Management*, 34(4), 474-488.
- Hunsinger, S. D., & Corley, K. J. (2013). What Influences Students to Use Dropbox? *Journal of Information Systems Applied Research*, 6(3), 18-25.
- Industry Classification Benchmark. (2017, February 01). *ICB Structure*. Retrieved April 05, 2017, from Industry Classification Benchmark (ICB): <http://www.ftse.com/products/downloads/ICBStructure-Eng.pdf>

- Islam, S., Weippl, E. R., & Krombholz, K. (2014). A decision framework model for migration into cloud: Business, application, security and privacy perspectives. *Proceedings of the 16th International Conference on Information Integration and Web-based Applications & Services* (pp. 185-189). Hanoi, Vietnam: ACM.
- Jamshidi, P., Ahmad, A., & Pahl, C. (2013). Cloud migration research: a systematic review. *IEEE Transactions on Cloud Computing*, 1(2), 142-157.
- Janakiram, M. S. (2012). *Demystifying the cloud*. Janakiram & Associates.
- Jermyn, J., Hwang, J., Bai, K., Anerousis, N., & Stolfo, S. (2014). Improving readiness for enterprise migration to the cloud. *Proceedings of the Middleware Industry Track* (pp. 5-12). Bordeaux, France: ACM.
- Johnston, K. A., Abader, T., Brey, S., & Stander, A. (2009). Understanding the outsourcing decision in South Africa with regard to ICT. *South African Journal of Business Management*, 40(4), 37-47.
- Kakabadse, A., & Kakabadse, N. (2002). Trends in outsourcing:: Contrasting USA and Europe. *European management journal*, 20(2), 189-198.
- Kakabadse, A., & Kakabadse, N. (2005). Outsourcing: current and future trends. *Thunderbird international business review*, 47(2), 183-204.
- Kaplan Inc. (2016). *SchweserNotes for the CFA Exam 2017 Level 1 Book 4 Corporate Finance, Portfolio Management and Equity Investments*. Florida, United States of America: Kaplan Inc.
- Kelle, U. (2007). Emergence" vs." forcing" of empirical data? A crucial problem of "Grounded Theory" reconsidered. *Historical Social Research/Historische Sozialforschung*, 19, 133-156.
- Kenny, M., & Fourie, R. (2015). Contrasting Classic, Straussian, and Constructivist Grounded Theory: Methodological and Philosophical Conflicts. *The Qualitative Report*, 20(8), 1270-1289.
- Khajeh-Hosseini, A., Greenwood, D., Smith, J. W., & Sommerville, I. (2012). The cloud adoption toolkit: supporting cloud adoption decisions in the enterprise. *Software: Practice and Experience*, 42(4), 447-465.

- Kishore, R., Rao, H. R., Nam, K., Rajagopalan, S., & Chaudhury, A. (2003). A relationship perspective on IT outsourcing. *Communications of the ACM*, 46(12), 86-92.
- Koh, C., Ang, S., & Yeo, G. (2007). Does IT outsourcing create firm value? *In Proceedings of the 2007 ACM SIGMIS CPR conference on Computer personnel research: The global information technology workforce* (pp. 87-91). St Louis, United States of America: ACM.
- Kroeze, J. H. (2010). Ontology goes Postmodern in ICT. *In Proceedings of the 2010 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists* (pp. 153-159). Bela Bela, South Africa: ACM.
- Kshetri, N. (2010). Cloud Computing in Developing Economies. *IEEE Computer*, 43(10), 47-55.
- Kundra, V. (2011). *Federal cloud computing strategy*. Washington DC, United States of America: The White House.
- Leavitt, N. (2009). Is cloud computing really ready for prime time? *Computer*, 42(1), 15-20.
- Lee, S. G., Chae, S. H., & Cho, K. M. (2013). Drivers and inhibitors of SaaS adoption in Korea. *International Journal of Information Management*, 33(3), 429-440.
- Levišauskait, K. (2010, January 16). *Investment Analysis and Portfolio Management*. Kaunas, Lithuania: Vytautas Magnus University. Retrieved from Bulgarian Chamber of Commerce and Industry : [http://www.bcci.bg/projects/latvia/pdf/8\\_IAPM\\_final.pdf](http://www.bcci.bg/projects/latvia/pdf/8_IAPM_final.pdf)
- Lian, J. W., Yen, D. C., & Wang, Y. T. (2014). An exploratory study to understand the critical factors affecting the decision to adopt cloud computing in Taiwan hospital. *International Journal of Information Management*, 34(1), 28-36.
- Lomborg, K., & Kirkevold, M. (2003). Truth and validity in grounded theory—a reconsidered realist interpretation of the criteria: fit, work, relevance and modifiability. *Nursing Philosophy*, 4(3), 189-200.

- Low, C., Chen, Y., & Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial management & data systems*, 111(7), 1006-1023.
- Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., & Ghalsasi, A. (2011). Cloud computing—The business perspective. *Decision Support Systems*, 51(1), 176-189.
- Matawire, R., & Brown, I. (2013). Profiling grounded theory approaches in information systems research. *European Journal of Information Systems*, 22(1), 119-129.
- Mehta, S., & Peters, L. S. (2007). Outsourcing a core competency. *Research-Technology Management*, 50(3), 28-34.
- Mell, P., & Grance, T. (2011). *The NIST definition of cloud computing*. National Institute of Standards and Technology, US Department of Commerce.
- Myers, M. D., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and organization*, 17(1), 2-26.
- Nasir, U., & Niazi, M. (2011). Cloud computing adoption assessment model (CAAM). *Proceedings of the 12th International Conference on Product Focused Software Development and Process Improvement* (pp. 34-37). Torre Canne, Italy: ACM.
- Oliveira, T., Thomas, T., & Espadanal, M. (2014). Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information & Management*, 51(5), 497-510.
- Ong, C. S., & Lin, C. T. (2013). The impacts of user readiness on perceived value. *Proceedings of the 76th ASIS&T Annual Meeting: Beyond the Cloud: Rethinking Information Boundaries* (pp. 1-10). Montreal, Canada: Association for Information Science and Technology.
- Orlikowski, W. J., & Baroudi, J. J. (1991). Studying Information Technology in Organizations: Research Approaches and Assumptions. *Information Systems Research*, 2(1), 1-28.

- Pahl, C., Xiong, H., & Walshe, R. (2013). A comparison of on-premise to cloud migration approaches. *European Conference on Service-Oriented and Cloud Computing* (pp. 212-226). Berlin, Germany: Springer.
- Pinheiro, P., Aparicio, M., & Costa, C. (2014). Adoption of cloud computing systems. *In Proceedings of the International Conference on Information Systems and Design of Communication* (pp. 127-131). Lisboa, Portugal: ACM.
- Porter, E. M. (1985). *Competitive strategy: creating and sustaining superior performance*. New York, United States of America: Free Press.
- Prahalad, C. K., & Hamel, G. (1990). The Core Competence of the Corporation. *Harvard Business Review*, 68(3), 79-91.
- Rathnam, R. G., Johnsen, J., & Wen, H. J. (2005). Alignment of business strategy and IT strategy: a case study of a fortune 50 financial services company. *Journal of Computer Information Systems*, 45(2), 1-8.
- Roche, E. M., & Blaine, M. J. (1996). *Information technology, development and policy*. Aldershot, United Kingdom, England: Ashgate Publishing Limited.
- Saunders, C., Gebelt, M., & Hu, Q. (1997). Achieving success in information systems outsourcing. *California Management Review*, 39(2), 63-79.
- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students* (5th ed.). London, United Kingdom: Pearson Education/Prentice Hall.
- Shimba, F. (2010). *Cloud computing: Strategies for cloud computing adoption*. Dublin, Republic of Ireland: Dublin Institute of Technology.
- Sibbet, D. (1997). 5 years of management ideas and practice 1922-1997. *Harvard Business Review*, 75(5), 2-12.
- Silvius, G. A., Turkiewicz, J., Keratsinov, A., & Spoor, H. (2013). The relationship between it outsourcing and business and it alignment: An explorative study. *Computer Science and Information Systems*, 10(3), 973-988.
- Singh, R., Patel, P., & Sahoo, B. (2014). A Compendium of Cloud Computing. *IJACTA*, 2(1), 73-79.



- Smits, M. T., van der Poel, K. G., & Ribbers, P. M. (2003). Information Strategy - Assessment of information strategies in insurance companies. In R. D. Galliers, & D. E. Leidner, *Strategic Information Management - Challenges and strategies in managing information systems* (pp. 64-88). Oxford, United Kingdom: Butterworth-Heinemann.
- Statistics South Africa. (2017). *Gross domestic product, 1st Quarter 2017 [PowerPoint slides]*. Pretoria, South Africa: Statistics South Africa.
- Subashini, S., & Kavitha, V. (2011). A survey on security issues in service delivery models of cloud computing. *Journal of network and computer applications*, 34(1), 1-11.
- Suddaby, R. (2006). From the editors: What grounded theory is not. *Academy of management journal*, 49(4), 633-642.
- Tan, J. (2010). Grounded theory in practice: issues and discussion for new qualitative researchers. *Journal of Documentation*, 66(1), 93-112.
- Tas, J., & Sunder, S. (2004). Financial services business process outsourcing. *Communications of the ACM*, 47(5), 50-52.
- Turner, D. W. (2010). Qualitative interview design: A practical guide for novice investigators. *The qualitative report*, 15(3), 754-760.
- Urquhart, C., & Fernández, W. (2013). Using grounded theory method in information systems: the researcher as blank slate and other myths. *Journal of Information Technology*, 28(3), 224-236.
- Van Niekerk, J. C., & Roode, J. D. (2009). Glaserian and straussian grounded theory: Similar or completely different? In *Proceedings of the 2009 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists* (pp. 96-103). Vaal River, South Africa: ACM.
- Van Teijlingen, E. R., Rennie, A. M., Hundley, V., & Graham, W. (2001). The importance of conducting and reporting pilot studies: the example of the Scottish Births Survey. *Journal of advanced nursing*, 34(3), 289-295.

- Vaquero, L. M., Rodero-Merino, L., Caceres, J., & Lindner, M. (2008). A break in the clouds: towards a cloud definition. *ACM SIGCOMM Computer Communication Review*, 39(1), 50-55.
- Venters, W., & Whitley, E. A. (2012). A critical review of cloud computing: researching desires and realities. *Journal of Information Technology*, 27(3), 179-197.
- Vignos, J., Kim, P., & Metzger, R. L. (2013). Demystifying the Fog: Cloud Computing from a Risk Management Perspective. *Journal of Information Systems Applied Research*, 6(3), 26-33.
- Waarts, E., Everdingen, Y. M., & Hillegersberg, J. (2002). The dynamics of factors affecting the adoption of innovations. *Journal of Product Innovation Management*, 19(6), 412-423.
- Walker, D., & Myrick, F. (2006). Grounded theory: An exploration of process and procedure. *Qualitative health research*, 16(4), 547-559.
- Weber, R. (2004). Editor's comments: the rhetoric of positivism versus interpretivism: a personal view. *MIS quarterly*, 28(1), iii-xii.
- Wu, W. (2011). Developing an explorative model for SaaS adoption. *Expert systems with applications*, 38(12), 15057-15064.
- Xin, M., & Levina, N. (2008). Software-as-a-Service Model: Elaborating Client-side Adoption Factors. In *Proceedings of the 29th International Conference on Information Systems*. Paris, France: AIS.
- Yang, C., & Huang, J. (2000). A decision model for IS outsourcing. *International Journal of Information Management*, 20(3), 225-239.
- Yang, D. H., Kim, S., Nam, C., & Min, J. W. (2007). Developing a decision model for business process outsourcing. *Computers & Operations Research*, 34(12), 3769-3778.
- Yang, S. Q. (2012). Move into the Cloud, shall we? *Library Hi Tech News*, 29(1), 4-7.
- Youssef, A. E. (2012). Exploring cloud computing services and applications. *Journal of Emerging Trends in Computing and Information Sciences*, 3(6), 838-847.

Zardari, S., Bahsoon, R., & Ekárt, A. (2014). Cloud Adoption: Prioritizing Obstacles and Obstacles Resolution Tactics Using AHP. *In Proceedings of the 29th Annual ACM Symposium on Applied Computing* (pp. 1013-1020). Gyeongju, Republic of Korea: ACM.

## Appendices

### Appendix A: All codes identified during open coding

Code	Sample incident	Occurrence	Recurrence
Client architecture	<i>"We don't disclose our architecture or the fact that we use cloud computing to our clients, unless they ask specifically"</i>	2	1
Client benefits	<i>"You don't give clients you know a thick client or even a thin client, just a zero client with a web browser. And that was very appealing because there is no installations you just go to the, you know, log in address out comes the page. You log in and you're in the system."</i>	42	15
Client cost sensitivity	<i>"This works quite well, so a smaller manager who has broken away from a large investment manager and have set up a little five-person operation and only have five portfolios, we can actually give them portfolio attribution for a fraction of the cost that it would cost a large investment manager."</i>	30	13
Client functionality	<i>"Cloud based solution the flexibility for us to deliver functionality to our clients, the calculation speed and power that we would have would be unbeatable versus an ordinary installed version software or mainframe based solutions. Far cheaper, far faster, far quicker."</i>	50	12
Client history	<i>"... our clients are well established and established years ago"</i>	12	4
Client IT environment	<i>"so you end up and then they're working on a slightly different version of Sequel Server or they've got a slightly different version of Windows or whatever and the combination of these things creates potential problems in environment that you couldn't anticipate in your bug testing"</i>	28	13

Code	Sample incident	Occurrence	Recurrence
Client perception	<i>"... Fudd, fear uncertainty and doubt."</i>	28	9
Client processes	<i>"Their current batch on our platform runs for 17 hours, if they can drop that down to an hour. They gain for themselves a day and a half of daylight time."</i>	36	12
Client Product Stack	<i>"... our clients are all running on our installed stack"</i>	4	3
Client product strategy	<i>"Given the ability well here's a solution. We can do it on premise or Cloud we'll go on .The only time we will go to a cloud is if there are major cost implications"</i>	34	9
Client profile	<i>"... we picked up these smaller guys on our cloud based platform"</i>	23	6
Client size	<i>"This works quite well, so a smaller manager who has broken away from a large investment manager and have setup a little five-person operation and only have five portfolios, we can actually give them portfolio attribution for a fraction of the cost that it would cost a large investment manager. "</i>	11	6
Client solution cost	<i>"You need hardware on your side; you need operations people, you know you need all these costs associated with running a piece of software and that essentially you are taking that away"</i>	16	12
Client staff expertise	<i>"Then let just say that you start moving things into the cloud you actually have some cost there. You've got 3 Wintel engineers, 2 Unix engineers, 1 DBA. So that's the cost"</i>	12	7
Client Strategy	<i>"The people costs; the software costs; the IT costs just to operate your software is expensive"</i>	30	9
Competition	<i>"if you don't start now well your competitors might do it and be; you'll be stuck at the same problems because you always have installed software"</i>	14	8

Code	Sample incident	Occurrence	Recurrence
Connectivity	<i>"There was some concerns about the latency about the South African network"</i>	6	4
Control of data	<i>"Who owns our data and where is our data"</i>	7	4
CSP client relationship	<i>"They are happy to take that risk, because they trust as a vendor"</i>	7	5
CSP cost sensitivity	<i>"you end up with a large number of your developers solving bugs in old versions of software"</i>	11	5
CSP History	<i>The CSP's history has been an interesting one because we grow through acquisition primarily as products have grown"</i>	10	7
CSP IT environment	<i>"Software deployed on-premise with a client, instantly leaves the control of the vendor. They aren't in control of the environment or any customisations that are made locally."</i>	9	7
CSP maintenance costs	<i>"at one point we had sixty percent of our development team working on bug fixing and supporting old versions and even putting new software releases into old version software rather than building the latest version"</i>	13	9
CSP perceptions	<i>"...the negative of that is that they have this perception that everything else is bad"</i>	7	5
CSP performance	<i>"Significant portion of our global results are made up of cloud product sales"</i>	4	1
CSP Product	<i>"We're not loyal to the software that we hold so as we speak now we'll be re- looking at ...systems not because we want to move, just to make sure that we still have best solutions available to us "</i>	20	6
CSP product development	<i>"So take the existing product not try re-write it from scratch, rather look at lifting out little pieces of it, and chipping away at the problem, and keeping it compatible all the time so that clients are able to move on to the newer versions essentially"</i>	50	10

Code	Sample incident	Occurrence	Recurrence
	<i>migrating them out of on-premises into Cloud; making that transition really smooth</i>		
CSP Product stack	<i>"... our clients are running on our installed stack of about 7 products"</i>	11	7
CSP product strategy	<i>"...what we needed to do was to rewrite everything as a Cloud based product."</i>	59	8
CSP profile	<i>"...advantage I think was that we were big enough to can afford to do it and yet small enough to have the focus to do it"</i>	11	6
CSP release and upgrade strategy	<i>"...is to get to continuous deployment or more correctly continuous delivery."</i>	39	14
CSP staff expertise	<i>"we employ a lot of people who are very expert in Maths bring people with Physics backgrounds"</i>	23	6
CSP strategy	<i>"But our strategy has been technology"</i>	47	9
CSP Technology stack	<i>"and as a result of that we have a quite a wide range of technologies and programming stacks and products that we look after and develop"</i>	14	5
Cultural change	<i>"I would say that the biggest challenge we face as a business that was traditionally doing installed software was the cultural shock of doing software as a service which it obviously is."</i>	22	8
Demonstrations	<i>"It is difficult to sell stuff if you cannot demonstrate why it is critical to their business"</i>	6	6
Elasticity	<i>"... horizontal scalable, with immutable architecture"</i>	6	5
High availability	<i>"Understanding what scalability means and high availability means and durability and you know understanding designing for failure and writing your code "</i>	2	2
Industry Standards	<i>"So we use all the audit standards to give us the comfort that they are following the controls that's needed"</i>	8	4

Code	Sample incident	Occurrence	Recurrence
Intellectual property	<i>"so that the workarounds and the way they use the software because yes once a client got some software they might have a specific use and they might have built you know a store procedure to do a certain type of report or analysis that they want to look at"</i>	13	7
IT job security	<i>"Some resistance from IT staff because they feel threatened"</i>	6	3
IT support	<i>"We control the hardware and can turnaround support quite quickly"</i>	2	2
Jurisdiction	<i>"Swiss based clients where they have very very strict rules around data security, data jurisdiction or data sovereignty and so AWS they do have servers in Switzerland "</i>	5	3
Market Saturation	<i>"In SA if you have 90% of the market share what do you do"</i>	5	2
Migration	<i>"Converting to the Cloud is not a change in Technology; it is a transformation of Business and Culture."</i>	9	7
Modular	<i>"It is three separate products sold under the single sign on. So, we have an end to end integrated solution from your creation of the weights and returns of your portfolio through to your analytics and your risk"</i>	13	6
Multi-tenant	<i>"explained to me multi-tenant concepts and so got here was having a single set of code which everybody accesses so you don't install different code for different clients but you instead of having a single database for each client gets you get a multi-tenant database which is logically separated"</i>	18	11
Portability	<i>"... the code allows for the technology to be moved to a different hosts with very little disruption to service"</i>	3	1
Product architecture	<i>"The design of the architecture of product is very much one where its components you can pull the components out and replace them and put the new ones in it"</i>	16	8



Code	Sample incident	Occurrence	Recurrence
Product benefits	<i>"The mandate was it needs to be fast; the data volumes that it needs to handle must be a 100 times what we were used to, if not a thousand times, and it needs to be modern in its user interface"</i>	19	11
Product dispersion	<i>"Where you install so many versions of your software out in the wild. It's very difficult to replace it"</i>	7	5
Product education	<i>"Over the last eight years which is how long the cloud product been going for, we've really been educating the market in terms of what Cloud is about why it's good and it's solving a number of issues one of which is the expense"</i>	5	5
Product version disparity	<i>"With installed software, especially with our kinds of expert software, we have let's say you know hundred and fifty clients with the same product and all of them are pretty much some kind of unique version"</i>	16	10
Profitability	<i>"Over the last two years our revenue has been flat lining and our profits have halved because we spending money on the cloud product"</i>	3	2
Regulation	<i>"AWS comes forward with certain guarantees in the data that's in the Frankfurt region will never leave the Frankfurt region. So it's compliant with the E.U. regulation and then for our other clients we have a North American installed with AWS"</i>	6	5
Revenue	<i>"So really when it got launched in 2011 people started believing in it but it was still very small but now it represents forty percent of the revenues"</i>	14	3
Sales	<i>"So typically we've made a lot of sales to people who have never had our products before therefore they couldn't compare it to one of our other products"</i>	18	6

Code	Sample incident	Occurrence	Recurrence
Scalability	<i>"the data volumes that it needs to handle must be a 100 times what we were used to if not a thousand times"</i>	17	10
Security	<i>"In trying in selling it to clients the biggest question every client has is question of security"</i>	24	13
Self service	<i>"You don't log in and click buttons and click through wizards and all that. It's all automated"</i>	12	6
Time to market	<i>"We've got at least a year (2016 + 1) to go before we can say we've really done it"</i>	15	7
User Resistance	<i>"Coming from IT departments we have seen some resistance because they feel threatened, because of how hardware is maintained in the cloud programmatically. We have seen resistance because they feel like they are becoming redundant."</i>	11	6

Table 7: All codes identified during open coding

## Appendix B: Initial email invitations to the CSP

**From:** Sherwin Manjo

**Sent:** Friday, 01 April 2016 11:09 AM

**To:** Individual 1 (Group CEO)

**Subject:** Re: Master Research on Cloud Service Provisioning in the IM sector

Good Afternoon **Individual 1**

I trust you are well.

I am following up on this email from xxx sent last year. I was unable to chat to you when you were last in Cape Town, but I would love the opportunity to interview yourself for the purposes of my Master research. I am hoping to follow our interview up with interviews with other staff members who are involved with the **SaaS** product.

I have attached a brief introduction letter detailing my research, the aim of which is to provide further insight into the challenges that organisations like **your CSP** and others are faced with when offering cloud based solutions to the Investment Management industry.

I am hoping that we can set up a skype call or telecom to conduct the interview. Please let me know if you are able to participate, and your availability over the coming weeks\month.

I look forward to your response.

Kind Regards

Sherwin Manjo

## **Appendix C: Initial email invitations to the client business organisation**

**From:** Sherwin Manjo

**Sent:** 27 October 2016 04:49 PM

**To:** **Individual 4 (Senior IT manager)**

**Subject:** Masters Research in Cloud Computing

Hi **Individual 4**

I am busy completing my IS Masters (was due this year, but will probably be early 2017) and my research topic is regarding cloud computing. Specifically focusing on the challenges to cloud service providers, and I have interview both **Individual 2** and **Individual 1** from **the CSP**. Given your interaction with **the CSP** and specifically with the **SaaS product** I would love to interview you for the purposes of my research paper as the client perspective would be a very valuable one to consider.

I understand you are a very busy man, but I would really appreciate it if you would be willing to participate in my research. Attached please find my formal introduction letter detailing my research.

If you have any questions or concerns please let me know.

Kind Regards

Sherwin Manjo

## Appendix D: Official research invitation to participants



### Department of Information Systems

Leslie Commerce Building  
Engineering Mall, Upper Campus  
OR  
Private Bag X3 - Rondebosch - 7701  
Tel: +27 (0) 21 650 2261 Fax: +27 (0) 21 650 2280  
Internet: <http://www.commerce.uct.ac.za/informationssystemsl/>

#### Request to conduct research and interview participation consent form

Dear Sir,

In terms of the requirements for completing a Master's Degree in Information Systems at the University of Cape Town a research study is required.

The researcher, in this case Sherwin Manjo, has chosen to conduct a case study entitled "*The challenge to SaaS provisioning for core business activity: The case of the South African investment management industry.*" The researcher would like to request permission to conduct this case study at your organization. The objective of the research is to identify the main concern that Cloud Service Providers (CSPs) provisioning SaaS solutions for core business activities for the South African investment management industry are faced with and how this concern is resolved.

Your participation in this research is voluntary. All information will be treated in a confidential manner and used exclusively for the purpose of this study. No individual names will be recorded or published. You will not be requested to supply any identifiable information, ensuring anonymity of your responses. You can choose to withdraw from the research at any time for whatever reason, in accordance with ethical research requirements.

The data collection method will be a one-on-one interview with you initially. With a potential follow up interview depending on the research findings. The interviews will be conducted either at your business premises in Cape Town or telephonically and will last for between 45-60 minutes. If you are willing to

participate in this study, kindly sign the attached form and return to me at your earliest convenience.

Should you have any questions regarding this research, please feel free to contact me on 082 641 1153 or email: [Sherwin.manjo@alumni.uct.ac.za](mailto:Sherwin.manjo@alumni.uct.ac.za)

Your participation in this study would be greatly appreciated, but is entirely voluntary.

Sincerely,

**Sherwin Manjo**

Researcher \ M.Com Student, (UCT)

Department of Information Systems

University of Cape Town

Email:

[Sherwin.Manjo@alumni.uct.ac.za](mailto:Sherwin.Manjo@alumni.uct.ac.za)

**Professor Irwin Brown**

Research Supervisor

Department of Information  
Systems

University of Cape Town

Email: [Irwin.brown@uct.ac.za](mailto:Irwin.brown@uct.ac.za)

## Appendix E: Research Participant Consent Form

### Research Participant Consent Form

I, \_\_\_\_\_, consent to participate in the research on the challenge to SaaS provisioning for core business activity: The case of the South African investment management industry.

I am aware that participation is voluntary and that I may choose to withdraw from this study at any time, should I choose to do so.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## **Appendix F: Initial Semi structured interview guide for the CSP**

### **Personal profile questions**

- Your Job Function and duties
- Experience
- Professional background
- Education and Training

### **Initial questions**

- Could you please tell me about of your business organisation?
- Could you please give me a brief history of your business organisation?
- Who are your business organisations typical clients?
- How has your client profile changed over time?
- Have there been any surprises with regarding to your clients?
- What are your business organisations main products?
- Have there been any issues, major or minor, with your products offered?
- Have there been any surprises, positive or negative, with your products offered?
- How has your product offering changed over time?
- What has been the motivation for changing these products?
- What has been your existing clients reaction been to your products changing?
- What is the typical evolution like of a new or changed product from inception to market?
- On average how long does it take for a product to move inception to market?
- Has your business developed a cloud based Software as a Service Solution?
- Can you please provide me with some technical information of this cloud based Software as a Service Solution?
- What has been your existing clients reaction been to this cloud based Software as a Service Solution?
- How has the market generally taken to this cloud based Software as a Service Solution?
- Has the evolution of this cloud based Software as a Service Solution been different to your other non-cloud based products?



- Has the time to market differed this cloud based Software as a Service Solution compared to your other non-cloud based products?
- How has this product changed over time?
- Have there been any issues, major or minor, with your cloud based Software as a Service Solution being offered?
- Have there been any surprises, positive or negative, with your cloud based Software as a Service Solution being offered?

### **Probing questions**

#### **Motivational considerations**

- What was your motivation behind launching a cloud based Software as a Service Solution?

#### **Client considerations**

- Are any of your clients vehemently opposed to a cloud based Software as a Service Solution?
- Have you personally or your organisation attempted to address this concern?

#### **Technical considerations**

- Has there been any specific technical concerns that affected your cloud based Software as a Service Solution?

#### **Future considerations**

- Do you have plans to offer further cloud based Software as a Service Solutions?
- Would you do anything differently when developing your next cloud based Software as a Service Solution?
- What advice could you offer a Software vendor wanting to offer a cloud based Software as a Service Solution for investment management organisations?

## **Appendix G: Semi structured interview guide for the client business organisation**

### **Personal profile questions**

- Your Job Function and duties

- Experience
- Professional background

### **Initial questions**

- Could you please tell me about of your business organisation?
- Could you please give me a brief history of your business organisation?
- Who are your business organisations typical clients?
- What are your business organisations main products?
- What are the key business functions of your organisation?
- What if any business functions are outsourced to a third party?
- What were the motivating factors in deciding to outsource?
- How many different software packages or software solutions does your organisation utilise?

### **Cloud Questions**

- Are any of these software packages or software cloud based?
- Does your organisation make use of any other cloud offering (IaaS or PaaS)?
- What is your organisations current stance on cloud based solutions specifically SaaS?
- Originally when “cloud computing” first came on the scene, what was your organisations take on it?
- What has been the major motivating factor in deciding to utilise a cloud solution?
- What were the major concerns in utilising a cloud solution?
- What do you think your client’s reaction would be if you organisation had to utilise cloud solutions for more key business activities?

### **SaaS product being provisioned by the CSP**

- When you first heard of the SaaS product being provisioned by the CSP, what were your organisations initial thoughts?
- After the initial demo has this changed over time?

- What did you personally like about the SaaS product being provisioned by the CSP?
- What did you personally not like about the SaaS product being provisioned by the CSP?
- Do you believe that your organisation could adopt the SaaS product being provisioned by the CSP?
- What would be your major concerns in taking such a key business function and using a cloud solution for this?
- What would be the motivating factors in taking such a key business function and using a cloud solution for this?
- If you had the power to make changes to the SaaS product being provisioned by the CSP, what enhancements or features would you add?
- What do you believe the major challenges your organisation will face if it were to adopt the SaaS product being provisioned by the CSP?
- What advice would you give to a cloud service provider if they would want to offer products and solutions for key business activities in the Investment management sector?